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THE PRACTITIONER:

A JOURNAL

OF

THERAPEUTICS AND PUBLIC HEALTH.

EDITED BY

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VOL. XXIV.

JANUARY TO JUNE.

London:
MACMILLAN AND CO.
1880.

LONDON:
R. CLAY, SONS, AND TAYLOR,
BREAD STREET HILL, E.C.

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THE PRACTITIONER.

JANUARY, 1880.

Original Communications.

IS ACONITE A DIURETIC?

BY G. HUNTER MACKENZIE, M.D. EDINBURGH.

In his classic work on Therapeutics, Professor Wood, of Philadelphia, mentions four chief indications for the use of diuretics, viz.:—(1) To maintain the action of the kidneys (2) To evacuate fluid; (3) To soothe and diminish irritation of the genito-urinary organs; and (4) To alter the urinary secretion so as to prevent the deposition of calculous material. The following are selected from a series of hospital cases which were under careful observation for the purpose of testing to what extent (if any) aconite might meet the two first indications above mentioned.

Case I.—Female, æt. 35, suffering from incompetence of the aortic valves:—

a. Period of observation without aconite, 10 days.
b. Period of observation with aconite, 11 days.
(Taking tinct. aconiti, B.P., m. 5, three times a day.)
c. Daily average quantity of urine without aconite, 19·9 oz.
d. Daily average quantity of urine with aconite, 15·9 oz.
e. Daily average decrease under aconite, 4 oz.

On the 10th and 11th days of administration of the drug, gastro-intestinal disturbance ensued, necessitating its discontinuance, and rendering the observations on those two days unreliable.

Case II.—Male, æt. 45, suffering from aortic incompetence (albuminuria, dropsy) :—

a. Period of observation without aconite, 13 days.
b. Period of observation with aconite, 15 days.
(Taking tinct. aconiti, m. 2, every two hours.)
c. Daily average quantity of urine without aconite, 43·5 oz.
d. Daily average quantity of urine with aconite, 36·6 oz.
e. Daily average decrease under aconite, 6·9 oz.

On the 13th day of administration, vomiting, and on the 14th and 15th days, diarrhœa ensued, with the same effect as in Case I.

Case III.—Male, æt. 47, suffering from incompetence of the aortic valves (hydro-thorax) :—

a. Period of observation without aconite, 18 days.
b. Period of observation with aconite, 14 days.
(Taking tinct. aconiti B.P. m. 1, every two hours.)
c. Daily average quantity of urine without aconite, 77 oz.
d. Daily average quantity of urine with aconite, 76 oz.
e. Daily average decrease under aconite, 1 oz.

Case IV.—Female, æt. 17, suffering from incompetence of the mitral valve :—

a. Period of observation without aconite, 22 days.
b. Period of observation with aconite, 38 days.
(Aconite given in progressively increasing doses, until aconitism was induced. See chart.)
c. Daily average quantity of urine without aconite, 32·8 oz.
d. Daily average quantity of urine with aconite, 21·0 oz.
e. Daily average decrease under aconite, 11·8 oz.

f. Daily average specific gravity without aconite, 1023·0 oz.
g. Daily average specific gravity with aconite, 1022·8 oz.

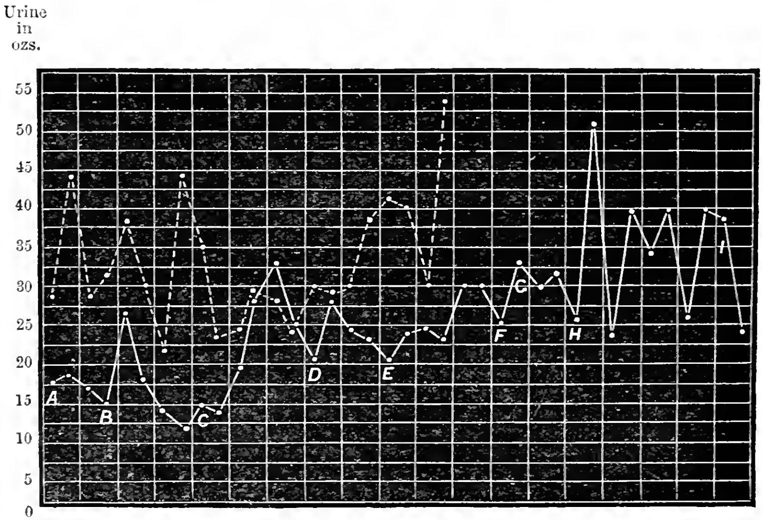

FIG. 1.—Chart showing the influence of aconite on the daily amount of urinary secretion. (Case IV.)

The interrupted line indicates the amount of urine in ounces without aconite. The continuous line indicates the amount with aconite. The letters indicate the amount of aconite being taken by the patient, thus :—

A.	Tinct. Aconite, B.P.	m 2, every	2 hours.		F.	Tinct. Aconite, B.P.	m 4, every	2 hours.	
B.	,, ,, ,,	m 3 ,,	4 ,,		G.	,, ,, ,,	m 6 ,,	6 ,,	
C.	,, ,, ,,	m 4 ,,	4 ,,		H.	,, ,, ,,	m 8 ,,	2 ,,	
D.	,, ,, ,,	m 5 ,,	4 ,,		I.	,, ,, ,,	m 10 ,,	2 ,,	(aconitism).
E.	,, ,, ,,	m 6 ,,	4 ,,						

CASE V.—Male, æt. 14, suffering from albuminuria (granular tube-casts) :—

a. Period of observation without aconite, 11 days.
b. Period of observation with aconite, 20 days.
(Aconite given in gradually increasing doses, as shown on chart.)
c. Average daily quantity of urine without aconite, 38·1 oz.
d. Average daily quantity of urine with aconite, 36·9 oz.
e. Average daily decrease under aconite, 1·2 oz.

Gastric pain, without diarrhœa, occurred on the 8th day of administration.

The teaching of the preceding cases is, that aconite neither maintains the action of the kidneys nor evacuates fluid. It

thus seems to be totally inert as a diuretic in cardiac or renal disease—a fact quite in accord with its physiological action. In another series of cases, however, where aconite was administered for its supposed "anti-pyretic" action, an increase of the urinary secretion followed its use.

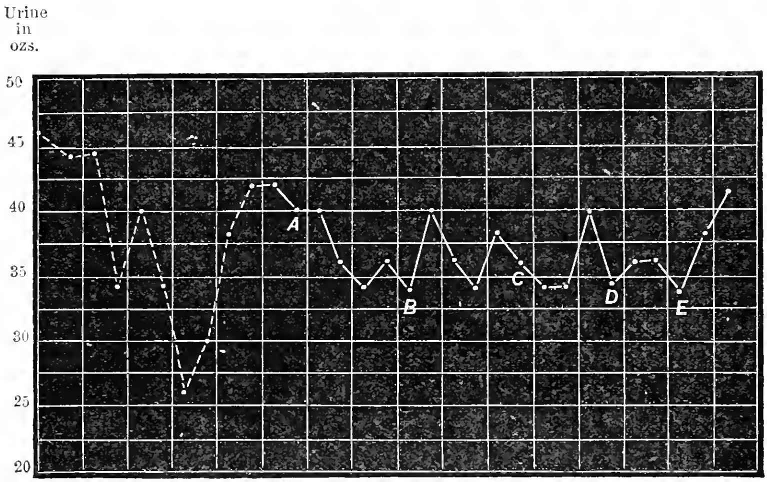

Fig. 2.—Chart showing the influence of aconite on the daily amount of urinary secretion. (Case V.)

The interrupted line indicates the amount of urine in ounces, without aconite. The continuous line indicates the amount, with aconite. The letters indicate the amount of aconite being taken by the patient at the period of observation, thus :—

A.	Tinct.	Aconiti,	B.P.	m 2,	three times	daily.
B.	,,	,,	,,	m 3,	,,	,,
C.	,,	,,	,,	m 4,	,,	,,
D.	,,	,,	,,	m 5,	,,	,,
E.	,,	,,	,,	m 7,	,,	,,

Case VI.—Female, æt. 20, suffering from phthisis pulmonalis (febrile) :—

a. Period of observation without aconite, 12 days.
b. Period of observation with aconite, 12 days.
(Tincture of aconite, m. 2, every two hours.)
c. Daily average amount of urine without aconite, 29·9 oz.
d. Daily average amount of urine with aconite, 37·2 oz.
e. Daily average increase under aconite, 7·3 oz.

Case VII.—Male, æt. 14, suffering from strumous suppuration of the ankle joint :—

a. Period of observation without aconite, 13 days.
b. Period of observation with aconite, 12 days.
(Tincture of aconite, m. 2, every two hours, 7 days.)
(" " m. 3 " " 5 ")
c. Daily average amount of urine without aconite, 34·2 oz.
d. Daily average amount of urine with aconite, 43·2 oz.
e. Daily average increase under aconite, 9·0 oz.

CASE VIII.—Male, æt. 16, suffering from phthisis pulmonalis (with evening febrile exacerbations) :—

a. Period of observation without aconite, 20 days.
b. Period of observation with aconite, 24 days.
(Tincture of aconite, m. 1, hourly.)
c. Daily average amount of urine without aconite, 35 oz.
d. Daily average amount of urine with aconite, 38·3 oz.
e. Daily average increase under treatment by aconite, 3·3 oz.

CASE IX.—Male, æt. 14, suffering from phthisis pulmonalis (febrile) :—

a. Period of observation without aconite, 9 days.
b. Period of observation with aconite, 9 days.
(Tincture of aconite, m. 1, every two hours.)
c. Daily average amount of urine without aconite, 38·7 oz.
d. Daily average amount of urine with aconite, 41·6 oz.
e. Daily average increase under treatment by aconite, 2·9 oz.

CASE X.—Female, æt. 17, suffering from phthisis pulmonalis (febrile) :—

a. Period of observation without aconite, 17 days.
b. Period of observation with aconite, 9 days.
(Tincture of aconite, m. 1, every two hours.)
c. Daily average amount of urine without aconite, 28·7 oz.
d. Daily average amount of urine with aconite, 32·7 oz.
e. Daily average increase under treatment by aconite, 4·0 oz.

The last series of cases is marked by the absence of cardiac or renal disease; and it thus appears that, where these do not exist, and in certain febrile conditions, aconite has a tendency to increase the urinary secretion. The failure of the drug as a

diuretic in the first series of cases may be "partially attributed to the congestion of the kidneys being so great as to render increased secretion impossible." (Wood.) Still the fact remains, that the remedy failed "when its action was most urgently needed." The quantity of water administered with the remedy could have little effect on the amount of urinary secretion, for one teaspoonful was the maximum given at a time. The free catharsis induced in Cases I. and II. probably contributed to the results there obtained.

A CLINICAL NOTE ON PRESSURE.

BY SAMPSON GAMGEE, F.R.S.E.

Surgeon to the Queen's Hospital, Birmingham.

On the 18th September, ult., a bloated, middle-aged man came before me in the out-patient room, with his right leg big, tense and purple, and exquisitely tender.

From the full notes taken by my dresser, Mr. W. R. Awdry, I condense the previous history, state on admission, and progress under treatment.

The man had earned his living as a hawker, been a hard drinker, and suffered from many attacks of venereal disease. On admission, the right leg was of greatly increased size, and of deep purple colour; the skin tense and shining, and intensely sensitive to the slightest touch. Circular measurement of the two legs gave the following result:—

	Right.	Left.
At the middle of the patella	18½ inches.	17 inches.
Six inches below	18 „	17 „
Round the malleoli . . .	14 „	11¼ „

8 P.M.—I enveloped the limb in a layer of jeweller's cotton-wool, over which I constructed a millboard and bandage compressing lattice-work. For this purpose I use thin millboard in the unfinished state—viz, unglazed and only lightly rolled. The board is broken (not cut) into strips one inch and a half wide, and from six to ten inches in length. Placing the strips on a metal tray, they soften in a few seconds on pouring over them a small quantity of hot water. The strips are placed diagonally over the limb so as to leave lozenge-shaped spaces

and intersect with layers of bandage. The lattice-work moulds beautifully to the inequalities of the limb, and forms a soft, yet strong, compressing shell. Between the turns of bandage, and over the cotton-wool, the moistened strips of millboard dry very quickly; and they can be remoistened very readily when the apparatus is taken down to be refitted accurately to the limb as it shrinks, which it does very rapidly. I use soft bandages, two inches wide, and apply them in intersecting spirals up and down the limb, scarcely ever making a reverse. So soon as the application was complete the patient pronounced himself perfectly easy.

September 19th, 9 A.M.—Bandages very loose from the considerable subsidence of swelling which has taken place in the twelve hours since they were applied. I applied another bandage with firmer pressure, and suspended the limb. The patient has passed a comfortable night, with the exception of some pain between midnight and 5 A.M. He is now perfectly comfortable.

8.15 P.M.—Has been very easy all day. On removing the apparatus the limb is much paler and softer, and scarcely tender on pressure. The patient's spontaneous expression is—"It is wonderful how I can bear it handled now, and I could not stand a feather touching it last night." The following are now the circular measurements of the right leg:—

		Decrease in 24 hours.
Mid patella	17 inches.	$1\frac{1}{2}$ inches.
Six inches below . . .	$15\frac{7}{8}$ „	$2\frac{1}{8}$ „
Round malleoli	12 „	2 „

The strips of pasteboard were remoistened to fit the shrunken limb, and bandaged to it in a lattice-work over cotton-wool, with increased pressure. The application last night, though conducted most gently, caused occasional exclamations of intense pain; but the patient bore it to-night, though executed comparatively roughly, without the least pain.

The same dressing was repeated daily, and at the end of a week the two legs were of equal size.

Admitting the beneficial influence of rest and position, there can be no question that the immediate relief of pain and the

rapid subsidence of swelling were chiefly due to smooth elastic pressure. A similar plan of treatment employed in cases of severe sprain and after other injuries attended with great tension, heat, and pain, is followed by equally satisfactory results—almost immediate ease and rapid subsidence. How does pressure act in these cases ?

In the big, tense, shining, purple leg already referred to, the extreme sensitiveness admits of explanation, by the compression and irritation to which the nerves were subjected in the swollen and solid limb. The irritation of the nerve-filaments, carried along their trunks to the respective vaso-motor centres, became a cause of still further vascular excitement; and so a circular chain of intensifying cause and effect became established,—more blood and extravasation in the limb, more nerve-fibre irritation, greater vaso-motor excitement, and proportionately greater determination of blood and its inevitable results.

The mere act of laying the patient on his back and raising the foot, had a tendency to empty the leg of some of its redundant blood; and the elastic pressure of the millboard and bandage lattice-work over cotton-wool rapidly and powerfully contributed to the same result. The experiment of raising one hand vertically above the head, while the other is held dependent by the side, proves the rapid influence of position in emptying a limb of its blood, for in a very few seconds the raised hand is pale and comparatively ensanguine.

Charles Bell [1] had a clear conception of the ease with which a limb can be emptied of much of its blood by bandaging, when he advised rolling a limb before amputation, to empty the veins into the general system and save blood. This is the expulsive principle which Esmarch has carried out, with so much thoroughness and usefulness, in his apparatus for bloodless operations.

In our big, purple, tender limb, the balance of arterial and venous pressure was disturbed beyond the possibility of natural readjustment. It was restored by position and external elastic pressure, and, so soon as the normal hydraulic condition of the local circulation was re-established, the man was at ease, and the limb quickly softened and shrank.

[1] *Illustrations of the great Operations of Surgery.* London, 1821, p. 58.

In his observations on the treatment of inflammation by digital compression,[1] Vanzetti has advanced cogent clinical experience in support of the principles advocated in this paper:—

"From the time when I ascertained that the true method of treating aneurisms is to compress the arterial trunk with the unaided hand, I did not doubt that such obvious and perfect means of intercepting the flow of blood in an artery might also be available in the treatment of inflammations in any part in which the principal artery admits of compression with the finger.

"I have many times employed, without other help, digital compression of the femoral, the brachial, or the sub-clavian, in phlegmons, articular inflammations, &c., and I found it so efficacious that I made it the ordinary method of treatment in every emergency in my clinique in which it was practicable.

"The cause of the salutary effects which must follow diminished supply, or retarded impetus, of blood to an inflamed part, is too manifest to need explanation. . . . Compression will cure every incipient inflammation; but it is obvious that when the inflammatory action has made considerable progress, though it be checked by digital compression, the restoration of the part to its normal state cannot be anticipated, before time enough has elapsed for the absorption of the inflammatory products."

With all deference to the illustrious Paduan professor from whom I have just quoted, compression will do much more than cure incipient inflammation. His precept in favour of digital compression is admirable, and with it he associates elastic compression and elevation of the limb. It will be found that pressure exercises an antiphlogistic and resolvent power, of which those who have not methodically tried it can scarcely have a conception.

I have treated elsewhere at length on the influence of "Pressure in Wound Treatment," and daily experience adds strength to the conviction that pressure, as a therapeutic agency in the general practice of surgery, has not yet attained that position in the estimation of surgeons to which it is entitled on scientific and practical grounds.

[1] *Giornale Veneto di Scienze Mediche*, vol. x., serie ii., translated in *Treatment of Fractures of the Limbs*, by Sampson Gamgee. London: Churchill, 1871.

ON TIGHT-LACING.

BY DYCE DUCKWORTH, M.D., F.R.C.P.,

Assistant-Physician to St. Bartholomew's Hospital.

It seems a gross reflection upon the boasted advance of knowledge, and the spread of higher education in the present day, to have to call attention to the unquestionable fact that women in all ranks of life, continue, in numberless instances, to wear stays that compress their bodies to an abominable extent. One had hoped that this was a thing of the past, and which had been left off by the grandmothers of the present generation. I am not prepared to assert that marked instances "of tight-lacing liver" are likely again to become frequent, but I am confident that much injury to various organs, and a good deal of impaired health, are due to over-compression of the trunk in women. This matter has not of late been duly considered by our profession. Some writers on dyspepsia have certainly called attention to it, and amongst these Dr. King Chambers has done most in recent times.[1] His clinical skill, aided by his cultivated artistic knowledge, enabled him to handle the subject vigorously. I have repeatedly verified his statements, and am convinced of the importance of the matter.

The great and lamentable mischief in a case of hygiene of this kind is that the vagaries of fashion come in to thwart the teachings of what some people call *science*, but which are, in truth, nothing else but those of common sense. We have heard much of late years of education in art—of "high art," as it is glibly called—and we have seen some of the results of it in startling and peculiar costumes arranged for the fair sex. "High

[1] *The Indigestions.* 1867.

art" happily admits of no tight-lacing. But the fashion has not rested with it, and I am informed that it is now ordained that small waists are again to be in vogue.

The tides of fashion, however, do not nowadays set in for any long time; and although it is of sad interest to know that such folly is enjoined for the present, and to believe that many frivolous and wrong-minded women will adopt the mischief, yet it is certain that some other fashion will soon displace what is now considered becoming.

My remarks in this paper are not evoked by the present injunctions of those who direct these matters, though it would always be right, I believe, for the profession to make its protest against all such fashions as are plainly wrong and unwholesome for such of the community as they affect, but they are intended to direct more particular attention to the fact that, be the fashion what it may, many women habitually wear stays which are much too tight for them.

It is bad enough that women of the upper classes should follow the vagaries of fashion when they are mischievous, but it is a more grievous thing to reflect that the servile imitators of these women in the lower orders shall be made to suffer also, both directly and indirectly. One might find many topics to enlarge upon in following out these considerations. To mention but one: if women in the upper ranks of life dressed with greater plainness and economy, we should certainly see less of the vulgar finery and caricatures, of the pinchbeck and shams which women in humbler life affect in ridiculous imitation of their betters. And thus much money would be saved, thrifty habits would be practised, and comfort, decency, and cleanliness would reign, where now, dirt, tawdriness, and general unwholesomeness prevail.

I have to state, then, that I find in a considerable proportion of women amongst hospital patients, and frequently in the case of those in higher ranks, that the stays are either too small, or are fastened too tightly. In many instances this compression is practised unwittingly. Stays last for a long time. The wearer grows, and the stays are too small, or they are procured just as any other article of dress, without reference to the particular figure they are to encircle.

In most instances stays are made by the gross like gloves, stockings, or boots; they are kept in different sizes, but no care is commonly taken to secure a proper fit. It must be borne in mind that they constitute a very important article of clothing for the poorer women, since they are by them regarded chiefly for their warmth, and not merely for support. It usually happens that they are adopted in early life, and as puberty approaches, insufficient attention is paid to the changes occurring in the figure at that period. And thus at an early age young girls come instinctively to accustom themselves to a measure of constriction from their stays.

When new stays are required, there is at once a repugnance to such as would fit properly, and, therefore, the same degree of tightness is imperatively demanded as has been hitherto borne. Thus it is that when one comes to examine into the matter, the unvarying remarks are offered—"I am not at all tight; my stays are quite easy and comfortable; I could not endure to be tight; I never lace tightly."

The result of the inquiry almost as commonly is, that the stays are found to be from one to four or five inches smaller in girth than they ought to be.

This miserable imprisonment is, as I have observed, in most instances involuntary; it is not practised because it is fashionable, it is not the result of ambition to have a small waist, but it comes about for the most part in the manner I have described. Of course in many cases it is done deliberately.

The results are more harmful than is generally believed, but they are only such as might be predicated.

I find many cases of dyspepsia in women yield quickly to the use of proper stays. Again and again I have known chronic vomiting in young girls to be due solely to tight stays. Palpitation and dyspnœa, not due to anæmia, are frequently caused by bad stays. The worst cases naturally occur in young women who are inclined to *embonpoint*, and whether this be constitutional or aggravated, as is that condition by anæmia, the obese tendency commonly both adds to the compression, and gives cause to the wearer to increase her troubles in the efforts to retain (what she conceives to be) shapely proportions.

Then the mere compression, bad as it is, is not all the

mischief entailed, for steel and whalebones add to the difficulties. In many cases it is quite impossible for the wearer to stoop, run far, or take wholesome exercise; and it comes to this, that many women in reality only carry on proper respiratory movements during the night when their stays are put off. To dress in the morning is to be fettered for the rest of the day; and it is too commonly the case that tight stays lead to undue tightness of the body of the dress.

Now all this is sufficiently intelligible, and to remedy it appears a very easy matter. In truth it is not so. It is a little troublesome, and withal somewhat offensive, to push home the necessary inquiries in any given case, and having got so far, it is difficult to persuade the patient of her mistake, and more difficult sometimes to secure any change for the better. Men-doctors are not supposed to understand these matters properly, and if this were granted, it were well that lady-practitioners came forward, and used their just influence in educating their sisters upon such a point.

Stays of proper form serve several good purposes. I have alluded to them as securing warmth, and they also afford suitable support in the cases of adult women, especially if they incline to corpulency. Serious objections attach to such stays as are now much worn, in which undue length adds materially to the compression of the upper abdominal organs. In young girls nothing more than a simple bodice is requisite, which should not reach as far as the pelvis. When the changes of puberty induce alteration in the contour of the thorax and hips, a modification is necessary. In the case of stout women, it is well to employ short and wide stays, and to supplement these by a well-fitted abdominal belt, which affords great support.

The object of this paper will be served if it helps to draw attention to this subject, which I believe to be of considerable importance in relation to our successful treatment of several common ailments of women. The fear I have is, that the matter seems so trivial that it can afford to be disregarded; but if it be true, as I believe it is, that the best results in practice are secured by attention to seeming details, then such an evil as constant compression of the thorax by badly fitting and unwholesome stays, must command full appreciation and suitable

treatment, in any given case, at the hands of every enlightened practitioner of our art.

P.S.—I have now before me an advertisement from *La Mode Illustrée* for last month respecting some patent corsets. Here are their proffered excellencies and the remarks about them:—

"Upon the shape of the corset entirely depends the accurate fit of a lady's dress. These corsets are finished by steam-moulding process, so that the fabric and bones are adapted with marvellous accuracy to every curve and undulation of the finest type of figure. They give great support, and fit so accurately and comfortably, that *a very small size can be worn without the slightest injury to the figure.* The variations in fashion are vigilantly watched, and every necessary alteration is made to adapt these corsets to the prevailing style of dress."

Is one word of comment necessary?

ON CATARRHAL PNEUMONIA AND TUBERCLE IN THE HUMAN LUNG.

BY D. J. HAMILTON, M.B., F.R.C.S. ED., L.R.C.P. ED.,

Demonstrator of Pathology, University of Edinburgh, Pathologist to the Edinburgh Royal Infirmary.

In a former series of articles on the subject of bronchitis (*Practitioner*, January to July, 1879), the origin and causes of the catarrhal discharge from the bronchial mucous membrane in that disease were fully inquired into. It was shown that the chief source of the cells in the bronchitic secretion is the deepest of the three epithelial strata which line the bronchi; while the superabundant mucous secretion is due to an increased activity of the glands of the mucous membrane, probably caused by an inordinately abundant blood-supply. The production of each constituent of the increased secretion, it was shown, consisted simply in an exaggeration of processes which occur under natural conditions. Normally, the fully-developed bronchial epithelium found in the superficial stratum originates from a more embryonic layer lying deeper. New cells are constantly being produced in this embryonic layer by a process of division, which springing upwards, are gradually evolved into ciliated columnar epithelium. In bronchitis this division of cells in the embryonal layer goes on much faster. They are over-stimulated, and instead of the resulting new-formed elements developing into columnar epithelium, they are cast off, in an incomplete state, as the cells of the catarrhal secretion.

The object of the present series of papers, is to trace out, in a similar manner, the so-called catarrhal changes which affect the alveolar walls, with special reference to their essential nature and mode of origin; and to show what the course, usual

terminations and complications of such catarrhal pneumonic processes are. A brief contrast will also be drawn between this and what is known as "croupous pneumonia;" and as the subject of "tubercle" is so inextricably bound up with that of catarrhal pneumonia in its different stages, it will also be shown what the mutual relations between it and catarrhal pneumonia are.

It is, however, absolutely necessary for the appreciation of what will follow, that the natural structure of the walls of the air-vesicles be made perfectly clear, for, we shall see, that in catarrhal pneumonia, as in bronchitis, the disease is in reality one of degree, and that it is impossible to draw a hard and fast line between the condition of parts in the normal alveolar cavity, and that which can be perceived when it is in a state of catarrh.

The Structure of the Wall of the Natural Air-Vesicles.

After the bronchioles have reached their minimum size, they expand into what is known as the infundibulum,—a mere common channel opening into the surrounding air-vesicles. It might be compared to a corridor with which many chambers freely communicate. It has no special walls, as in a bronchus, but is bounded on all sides by the adjacent air-vesicles.

As the bronchi diminish in size, the three strata of epithelium covering their mucous membrane are succeeded by a single layer, composed of somewhat cubical-shaped cells, and, as the air-vesicles are reached, the epithelial covering assumes all the characters of an endothelium, and by many is looked upon as such rather than as an epithelium. Such a classification, however, is misleading, for, as the epithelium of the whole of the respiratory passages has a common origin in the embryo, we shall find that it is important to keep this clearly in view in investigating the diseases to which it is liable.

In order to see the epithelial lining of the alveolar wall it is necessary to stain it with silver. The periplast of the epithelial cell is so delicate, and so completely transparent, that it cannot be otherwise observed. The silver markings, however, show its outlines with the greatest precision. Two representations of it are given in Figs. 1 and 2. The majority of the cells are large

flat plates with sinuous borders, (Fig. 1, *a*,) usually having a nucleus in the centre, which is only rendered visible by the application of different colouring reagents, such as hæmatoxylon. In many instances, evidently in the oldest cells, no nucleus can be perceived, and such cells seem to consist merely of a flat structureless plate of a keratine-like substance. They wind round the partitions between one air-vesicle and another, and mould themselves to all the inequalities of the

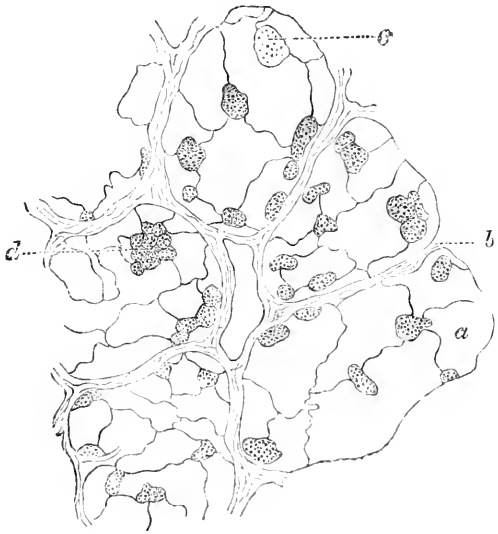

Fig. 1.—Alveolar cavities from the kitten, stained with nitrate of silver. ×450 diams. *a*, outlines of fully developed epithelial cells; *b*, alveolar walls; *c*, a young epithelial cell losing its granular appearance; *d*, a group of young epithelial cells germinating.

surface, in this way forming a complete investment for the underlying fibrous tissue and lymphatic spaces of the alveolar wall.

Besides these, however, there are other bodies of a somewhat different structure, which are constantly seen in lungs silvered by injection into the trachea. They are more abundant in young animals than in old, and, apparently, are more numerous in the lungs of some species than others. In the lung of the kitten they are particularly well developed, but in the lungs of all young mammals, including that of the child, they can be seen.

They are more or less polygonal cells, which sometimes lie in little groups (Fig. 1, *d*), at other times have an isolated position Fig. 2, *a*). When stained with nitrate of silver they have not the same homogeneous aspect as the larger cells, but appear to possess a much more granular consistence. They can, moreover, on account of this granularity, be distinctly seen lying on the alveolar wall, in preparations unstained with silver and simply in their natural state, or when coloured by logwood or carmine. They stain deeply with these colouring reagents, while the larger flat cells remain unaffected. When viewed in profile as in Fig. 2, *a*,

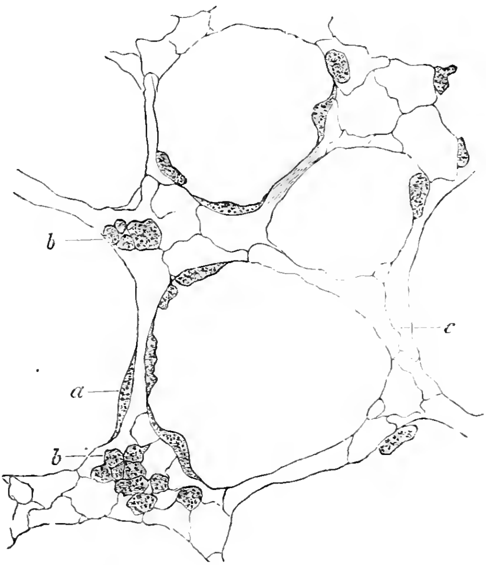

Fig. 2.—Alveolar cavities from the kitten stained with nitrate of silver. ×450 diams: giving a profile view of the epithelium.

they are seen not to be flat, but to rise above the surface, and to project into the alveolar cavity. They can be detached by means of pencilling, or merely by the pressure of the cover-glass, and they leave a little cup-shaped space when so removed. They sometimes exhibit a nucleus, especially if they are large, but, in other cases, this is imperceptible.

Various theories have been offered as to what these bodies are.

It has been suggested by Klein (*Lymphatic System of the Lung*) that they correspond to the pseudo-stomata found in serous membranes,—the projecting cell being in reality an underlying connective tissue corpuscle, which, pushing its way through an aperture in the endothelial lining, comes to project on the surface in the manner described. This, however, is not borne out in fact, for when we come to examine an alveolar wall which has been transversely cut, and where these can be seen in profile as in Figs. 2 and 4, it is evident that they do not sink into, or originate from, the substance of the alveolar wall, but are confined to the surface, at the same level as the ordinary flat epithelium. They, further, do not resemble pseudo-stomatous cells, in the fact that groups of them are found scattered here and there over the wall of the air-vesicle, instead of being single, as in the case of pseudo-stomata in other parts. They look much more like the young endothelial cells found on serous membranes, as, for instance, on the omentum and mesentery, and it seems only rational to conclude that they are such, and that they, in course of time, would supply the place of those older cells which are constantly being cast off. The conversion of the granular protoplasm of the one into the hyaline substance of the other can actually be demonstrated in preparations such as that from which Fig. 1 was taken, where cells, intermediate in size and granularity (*c*), can always be discovered.

That these embryonic epithelial cells are constantly germinating there cannot be the slightest doubt, for groups in which the cleavage is proceeding are of common occurrence, and it is a significant fact, as bearing on what follows, in regard to the pre-disposition of young individuals to catarrhal pneumonia, that these germinating groups are undoubtedly more numerous in young than in old animals.

It is therefore apparent that, in structure, the epithelium lining the air-vesicles has the closest resemblance to the deepest stratum covering the bronchus. Both, when silvered, have much the character of an endothelium, and both contain young germinating cells.

Although there seems to be little evidence that these young granular embryonic cells are of a connective tissue type, yet

that they have a pseudo-stomatous action in transferring foreign bodies from the alveolar cavity, to an underlying lymphatic as claimed by Klein and others, can be verified. In order to understand how this takes place we must examine the other constituents of the alveolar wall. The basis or stroma of the alveolar wall in the human subject is mainly composed of yellow elastic fibres and capillary blood-vessels. The former are in abundance, and have a figure-of-eight arrangement between one alveolar cavity and another. Besides these two constituents, however, there is a little white fibrous tissue with nuclei lying upon it, and, if carefully examined, free wandering cells of large size, and probably of a connective tissue type, are also to be seen. These cells are shown in Fig. 3 *c*, taken from the lung of the kitten, but they are also found in the human lung quite as abundantly. The blood-vessels of the lung from which this drawing was made had been injected with silver, and sufficient had exuded from them to stain some of the parts in their immediate neighbourhood, manifestly of the connective tissue-cells above referred to. They are large rounded, or oval bodies, which lie at a deeper level than the epithelium, and usually close to the concavity of a capillary blood-vessel, whose shape they assume. They are finely granular, and differ in contour from the germinating epithelium before described, part of which is also seen at the lowest portion of the figure. The capillary blood-vessels ramifying on the alveolar walls are represented in this figure, showing how great a part of the space between two adjacent alveolar surfaces is occupied by them. The sinuous lines seen upon them are, of course, the borders of their endothelial cells, stained with silver.

Besides blood-vessels, however, there is an abundant lymphatic supply, in the shape of plasmatic spaces, which lie between the bundles of elastic and white fibrous tissue. They form a series intercommunicating and branching channels in the substance of the alveolar wall. In order to see them they must either be stained with silver or, what is much better, examined in the lung of a coal-miner. In the latter case they become injected with inhaled particles of carbon or coal, which indicate their shape and position with great distinctness. A representation is given in Fig. 4 of a transverse section of an alveolar wall, from a well-

marked case of anthracosis. On its surface a group of germinating epithelial cells (*a*), similar to those seen in Fig. 1 *d*, is represented, and other groups are seen at different parts of the figure, in neighbouring air-vesicles. They are raised above the surface, and, in the interspace between two of them, black pigment particles have insinuated themselves, and have been

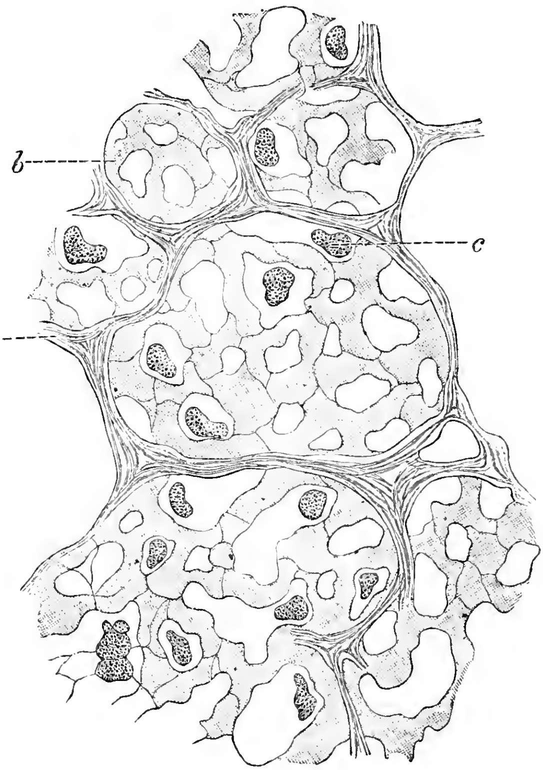

FIG. 3.—Alveolar cavities of lung of kitten. Blood-vessels injected with silver; *a*, alveolar walls; *b*, endothelium of injected capillaries; *c*, connective tissue cells.

carried into an underlying plasmatic or lymphatic space (*b*). Here they have accumulated, and have injected the space, so as to show its contour. These spaces have a branching or stellate appearance, and it can be seen how the pigment contained in the one is transferred to the other, by means of the free anastomosis which exists between them. In this way a complete

series of lymphatic channels is formed in the alveolar wall, having a direct communication with the alveolar cavities by means of the openings between the epithelial cells. Foreign bodies are carried by them into larger lymphatic vessels in the bronchial and arterial adventitious coats, and also into the interlobular septa, by which they ultimately reach the bronchial glands and deep layer of the pleura.

The inhaled particles of dust usually gain admission to the alveolar lymphatic spaces through passing, as above described, by the side of a young epithelial cell. Just as frequently, however, they first get into the cell, and are then apparently transferred by it to the underlying plasma space; the young epithelium in this way performing a pseudo-stomatous function.

FIG. 4.—Section of a coal-miner's lung, showing the lymphatic spaces of the alveolar wall injected with pigment particles. ×450 diams. *a*, pseudo-stomatous openings; *b*, underlying lymphatic spaces injected with black pigment.

The tissues that we shall have to deal with, as composing the alveolar wall, are therefore:—(*a*) A flat layer of epithelium more or less germinal in character according to the age of the subject. (*b*) Elastic tissue and small bundles of white fibrous tissue, with occasional connective tissue corpuscles. (*c*) An abundant plexus of capillary blood-vessels, and (*d*) a system of plasmatic spaces communicating with the lymphatic vessels of the interlobular septa, arteries, bronchi, and deep layer of the pleura.

In many respects the tissues composing the alveolar walls are essentially those found in serous membranes. The latter are

made up of a fibrous basis with connective tissue cells, plasmatic spaces, and lymphatic vessels; and, covering the surface, there is a delicate endothelium with pseudo-stomatous openings upon it. If the tissue composing the alveolar walls were unfolded it would be hard to find any real difference between its structure and that of a serous membrane, such as the peritoneum or pleura. It will, therefore, be advisable to keep in mind, in studying the diseases of the air-vesicles, what the morbid affections of serous membranes are, and to consider in how far the causes and effects of different forms of irritation correspond in the two tissues. The only point of real difference that exists between the two, is in the origin of their endothelium; for, while that of the peritoneum, and of most serous membranes, is to be looked upon as a meso-blastic structure, the pulmonary endothelium or epithelium, as we may choose to call it, is to be referred to the hypo-blast. We shall see that the distinctive characteristics implanted upon each in fœtal life are never lost after birth, for although certain morbid appearances in the one closely resemble those found in the other, yet there are some essential differences in their diseases, due to the fact of their having a dissimilar embryonic origin. In one respect this is very remarkable. The endothelium covering the pulmonary air-vesicles, and that found on the peritoneum or pleura, are both liable to germinate under undue stimulation. The appearances during the germinating stage are very much the same in both, but, while the result of the germination of the peritoneal or pleural endothelium is usually the construction of fibrous tissue and adhesions, no such fibrous adhesion of the walls of the air-vesicles ever occurs as a result of a similar increased vitality. On the contrary, we find, as a fact, that the resulting cells from such proliferation in the lung invariably degenerate, and that the varieties of degeneration to which they are subject are those of epithelial surfaces generally.

(*To be continued.*)

ALKALIES IN ANÆMIA.

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Introductory.—The above title may, at first sight, appear somewhat incongruous, and the first part of it to have no special connection with the latter, but I hope, on perusal, that the connection will be found a very interesting and intimate one. If the view we take of the subject is correct, the connection between the alkalies and anæmia is a very important one; and the following summary will show the general tenour of our paper.[1] First we think there is a hepatic anæmia, that is an anæmia produced by hepatic disorder; and we think this form of anæmia is remarkably common—in fact the commonest form, and that all cases of anæmia, without any apparent cause, are hepatic. Then we express our belief that the alkalies, especially potash, have a beneficial action on the liver, which action tends to restore the blood to its normal character. And finally, we think that the alkalies ought to take the place of iron in the treatment of anæmia.

Alkalies.—Now, as heretofore, medical men continue to prescribe, with infinite faith, drugs concerning whose *rationale,* or mode of action, they have little definite information to impart; suffice it that they all agree that the remedy does good. This was done by our forefathers; but where is their treatment now?—discarded as being inert, if not injurious. If, then, men like Cullen, Sydenham, and Gregory were deceived in their

[1] Cf. Murchison, *Functional Diseases of the Liver.* 2nd. Ed., p. 92.

therapeutics, why not the present generation? for it will not be denied that in years gone by there were as good observers, if not better, than there are now. Granting, however, that the remedy does good, though we know not how, then we are certainly justified in giving it; on the other hand, it may in reality be inert, and this in spite of the highest testimony to its efficacy. But I must confess that the profession is very tolerant in regard to treatment; at the same time, with our indefinite information, it could not be otherwise: in many cases the treatment is one of partiality for certain drugs, in other cases it depends on a varied judgment as to the importance to be ascribed to the different factors in the production of the disease. If, then, we have no infallible guide to one fixed and definite treatment (in any one disease), we must prove the different systems by trying which is the best. Now if this plan were carried out successfully, and one system of treatment proved superior to others, and the physiological actions of the drugs employed in it were definitely determined by experiment, not only would it be a great gain in itself, but we should, by our therapeutics, be able to throw some light on the pathology of the disease. At present our pathology dictates our treatment, and if in any instance the former is false, then the latter becomes absurd. Now the methods by which the late Prof. Bennett tried to extend our knowledge in therapeutics were, first, experiment on the lower animals, which is now being cultivated as largely as possible under adverse legislation; and secondly, by a system which is simplicity itself in principle, and consists in reporting *all* the cases treated by a certain drug or drugs. That is to say, if any man brings forward a drug or remedy as very valuable in a certain disease, let him report all the cases treated—how many deaths, how many recoveries, and the duration of each class of cases; then we should have something definite to work upon, a treatment with which to compare some other treatment. Let me give an instance to show the value of the system. In erysipelas iron is the remedy, *par excellence*, and thought to be superior to other drugs. Now let me ask what proof have we of this? Have we any reliable statistics of the duration and mortality of erysipelas under treatment by iron? I believe there are none; there only exist general statements in

favour of the treatment, and these have been absolutely contradicted by other writers of equal authority. Now if Dr. Bennett's plan were adopted we should have some definite information as to the fatality and duration of the disease; and it might be proven, perhaps, that the duration was from four to six days. If, then, there were other methods of treatment, say by salines, and the same plan adopted, we should be able to compare each from definite statistics instead of from indefinite opinion. I am very far from disapproving of the iron treatment, and often adopt it, but I do think that we are greatly in want of some definite information in support of the brilliant success claimed for it. Mr. Bryant goes so far as to state that at times it acts like a charm; if this be so, the duration of the disease ought to be all the shorter, and the success of the treatment made more easy of proof. Yet we have no evidence except mere opinion that iron is superior to other drugs in this affection. Now considering that erysipelas is very often fatal, I hold it to be a serious matter that the profession takes no trouble to put us in possession of reliable statistics as to the best method of treatment, not only in this solitary instance, but in the case of all known diseases. And this ought not to be difficult for hospital surgeons and physicians where all the cases are tabulated or recorded in books. I dwell on this point of indefinite information as it is very important, and exists to such an extent in our system of therapeutics, that to attack some of these traditions seems like attacking well established facts; and further, because we are about to investigate some of these traditions now.

In discussing the alkalies I shall only refer to potash and soda, and it will be necessary first of all to inquire how far these are alike in their actions, and in what they differ. I believe in this country their similarity has been assumed to far too great an extent. Chemically they are not alike. Potash has a much greater affinity for oxygen than soda out of the system, and probably it is the same inside the system.

As regards the therapeutic differences as usually found in text-books, the following is a summary:—First, locally soda acts more on the liver, and potash on the kidneys. Secondly, potash acts on the glands, but soda has no corresponding action; or

expressed differently, soda is but a local antacid, whereas potash is, in addition, a general remedy. Thirdly, whereas both are depressing when continued for some length of time, soda is least so. And finally, in the uric acid diathesis, potash is preferable. Before discussing these points more in detail, I must protest against the alkalies losing their proper title and its being swamped in that of antacid. No doubt the alkalies are antacid, but as this action is not nearly inclusive of all the actions of the alkalies, why should it be used as a generic term? By adopting this nomenclature we are apt to place this action in undue prominence, and to ignore all the other actions. The greater should not be called by the lesser, and although it may be true that all men are liars, no modern man would think of classifying mankind under the head of "liars." Besides not being inclusive, it is not, in my opinion, of primary importance; and I venture to prophesy that when we know more about the alkalies and their mode of action, that this antacid doctrine will diminish in importance. Take the case of many skin eruptions where alkalies are of great benefit; there is no proof whatever of any undue acidity either in the digestive tract or in the blood. Look at nettle-rash; is this due to acidity? It seems strange that certain simple articles of diet in certain people should cause acidity. Or take the case of gout; if the alkalies only combined with the lithic acid formed they would be only palliative and temporary, and when omitted, the lithates in the urine and the pains in the joints should return, whereas we know that the alkalies are curative; and in addition to combining with the lithic acid already formed prevent any further formation. These observations offer a fitting place for the following consideration, namely, that in using the alkalies we must not limit ourselves to what may be called local symptoms or symptoms localised in the digestive tract, such as a furred tongue, loss of appetite, acid eructations, flatulence, heartburn, &c., for, as we shall see, there are conditions where none of these symptoms are present, and yet where the alkalies are beneficial and curative. Perhaps the best known indication that is not local are the abnormal urinary sediments whose formation is prevented by alkalies. I say this is a well-known indication for an alkali although there may be no symptoms of anything wrong with the digestive tract; it

is the same often with gouty pains; so, too, with many cases of eczema and other skin eruptions. In all these cases we may conclude that there is something wrong in the digestive tract, but it may not be shown by any local symptoms; this, we shall explain further on, is caused by a disorder of the liver, which is not directly connected with digestion so much as it is with the blood.

Another indication for the alkalies, lies in the fact that in many cases we have no antidote or agent for a direct attack on the disease, and so we must rest satisfied simply by assisting nature, leaving her to effect a cure. With this view may we give the alkalies, to improve the tone of the digestive system, increasing the appetite, aiding the liver to work, promoting the flow of bile, and clearing the blood and urine from lithates, or other sediments and impurities. Alkalies are not classed with tonics, but I regard them as tonic. By tone I mean a state of health, and if we can improve the unhealthy state of the gastro-enteric tract by alkalies, and assist towards a return of appetite and so on to a state of general health, then most assuredly the alkalies are tonic, and I think there is little doubt that the alkalies, more than any other remedy, can restore the digestive tract to a state of health, while iron, instead of giving tone, is apt to disorder the digestive tract.

To return now to the differences between potash and soda: as regards their special actions on the kidneys and liver, I have failed to find any very definite information on the subject; that soda will increase the flow of bile, or render it more fluid, is, I believe, true, but that it will act better in this respect than potash I do not believe. The experiments of Parkes show the bicarbonate of potash to be a diuretic; but the power of potash to increase the amount of urine is so small, that for all practical purposes it is unimportant, and for this purpose few practitioners, I fancy, would prescribe it. But when we come to the effects of alkalies on the composition of the urine it is a very different matter. Urine containing deposits, such as urates, phosphates, and oxalates, and high coloured urine, is quickly and remarkably acted on by alkalies. Now through a knowledge of the production of these abnormal pigments and deposits, we are partly enabled to determine the *modus operandi* of the alkalies as thus:

the pigment is derived from the biliary pigment, and the sediments from the digestive tract, or as Murchison more correctly, I believe, limits it, to the liver. Now if the alkalies clear the urine from these pigments and deposits, it must be in virtue of a salutary action on the liver, and if observation goes to prove that potash is more beneficial in these cases than soda, then I maintain it is in virtue of the superior action of potash on the liver. Certainly, in my opinion, the most important action of potash is on the liver, and especially on that function of disintegration on which the function of excretion depends, and the elimination of bile; and consequently the good effects of potash are seen, not locally only, but universally. This action of the alkalies was known and thoroughly believed in by the last generation, and at the present time many old and good general practitioners adopt it daily in their practice, believing that the alkalies increase, and render more fluid, the bile. But the full extent of this action was not sufficiently recognised, and is not yet. It was bile as a secretion for the purposes of digestion that they had in view; but its use as a secretion for the purposes of removing waste products from the blood and thus keeping it pure, was unnoticed. It is true that when the secretion of bile was entirely stopped, they recognised jaundice as resulting; but between a healthy liver and jaundice they had no stepping stones—no little disorders of the liver causing impurities of the blood and many remote and general disorders. Even a high-coloured urine was not localised in the liver, but was indefinitely ascribed to the digestive organs, and its etiology ill-understood. In what manner potash acts on the liver may be questionable; perhaps the oxidation theory may be correct, and the lithic acid converted into urea. But whether it be true or not, it is certainly true that under the administration of potash the liver is enabled to complete its work in a normal fashion.

Secondly, that potash acts on the glands and soda does not, or that soda is entirely local, is a belief that is liable to great misconception, and under the arrangement often adopted in our text-books, and markedly so in Wood's—namely, of describing the actions of all the compounds under the head of the base—is still more liable to be misunderstood. Thus Wood, under the

head of potassium, details the actions of the compounds of potassium, which appears to me a most unfortunate arrangement. I was taught in chemistry that a compound possesses properties dissimilar from any of the elements composing the compound, and if this is so, Wood's arrangement is certainly perplexing. Now if by a glandular action of potash or its carbonate is meant an action similar to that produced by the iodide of potassium, then I must express my disbelief in it. Any action of the bicarbonate of potash on the glands is, I believe, an indirect one, and that the good it effects is solely due to its action on the liver, by which the blood is restored to its normal character. That soda can act similarly is, I believe, true, but its action is not nearly so rapid nor so powerful.

Thirdly, that the alkalies are depressing. This doctrine is one of the most interesting in connection with the alkalies. I have not succeeded in tracing its origin, and I am afraid that it is involved in much mystery. In all older works, and in many recent ones, there are the same expressions of belief, the same fears and warnings, which may lead some to think the doctrine true. On the other hand, there is such a similarity of expression and haziness about the whole doctrine, that we are tempted to believe that the origin of the belief may have been handed down from one source, and that one source not founded on fact, and existing now entirely as a tradition. Turning first to Miller's system of surgery, under the treatment of lithuria, we find it stated "that though the treatment by alkalies is simple, let it not be persevered in carelessly, lest the system becomes asthenic, and serious evils result, including an ammoniacal and phosphatic state of the urine." This be it noted is stated generally of the alkalies. Turning to *Neligan* we find the same statements, namely, that few people can bear the continued use of alkalies for any length of time, as it brings on anæmia, with oxalic deposits in the urine; also a state approaching scurvy, and a tendency to an over-acid secretion of the alimentary canal. To prevent or palliate these bad consequences, he would have us prescribe the alkalies with vegetable tonics. What proof these authors have for their views I know not at present. If we turn now to a more recent work, namely, Garrod, we find no mention made of the depressing action of the alkalies. But

if we turn to an American writer, namely, Wood, we get the older doctrine partially respected, along with the shadow of a *rationale.* Basing his classification on experiment, he divides the alkalies potash and soda, making the first a diuretic and general remedy, and the second merely a local antacid. The reasons for this are that experiment shows potash to have most depressing effects on the heart, when injected into the blood in large quantity—in fact, stopping its action in diastole. This being so, potash in large doses is decidedly depressing, and we might suppose that from this knowledge sprung the view that, given therapeutically, its continued use is depressing; but this is not so, for further on we find that this depression, or "dyscrasia," is unexplainable in the present state of our knowledge. This depressing action of potash on the heart is supposed to have been first noticed by Black in 1839; whether this was the source of the belief that when given therapeutically potash is depressing, I know not. Further on Wood states under the "Antacids," that soda injected into the blood even in large quantities having no depressing effect on the heart such as potash has, therefore it does not seem to be depressing when given therapeutically, nor to have any action on the system except that of antacid. Here we have a distinct denial of the old view as regards soda, and in Thorowgood's *Materia Medica* we have the statement that the salts of soda are not so depressing as those of potash. This view is essentially a chip of the old block tipped with a piece of the newer.

From these somewhat conflicting views, we may gather that the doctrine of the depressing action of the alkalies is not unanimously held by all physicians, and though some would have us believe it on the strength of clinical experience, others, who are more guided or biassed by experiment, have not observed this depressing action, in one alkali at least, namely, soda, and an authority like Wood is not to be put aside without question. How comes it if clinical experience clearly shows that the alkalies are depressing, that Wood has not recognised it? On the other hand, if Wood be correct that soda is not depressing, how comes it that most physicians have included soda under the "depressants"? Either experiment is not to be relied on, or else clinical experience is untrustworthy. The

history of the latter shows it to be anything but infallible, and notorious for change, and the former has many opponents who approach it with great caution, and I must say that in the case before us, I see no connection between the effects of large quantities injected into the blood, and the effects of small doses given therapeutically. I am in the habit of prescribing the bicarbonate of potash in 12 to 20 grain doses 4 times a day to individuals continuously, for months if necessary, and I have failed to observe any depressing effects whatever; but on the other hand I have observed great benefit to the patients in the majority of cases, and those cases in which potash has failed have generally turned out to be cases of serious organic lesion, or of tubercle, over which therapeutics have little control. In anæmia I find the best results from potash from the beginning to the end of the disease, and by it I hope to cure most of the cases I treat, unless due to tubercle, or secondary to some incurable lesion. Such being my experience of the alkalies, more particularly potash, I have come to the conclusion that there is no peculiar or mysterious depressing action about the alkalies, but I will admit that when given continuously for long periods, the patient or the patient's stomach may sicken at them, the same as it might do against any other monotony. If this be correct we can easily understand how the alkali, although doing a great deal of good, may have to be discontinued if the stomach turns against it. When we come to consider, it is very few things that the stomach can tolerate continuously. Ten or twelve articles will nearly exhaust the list of foods that can be taken daily, and many articles considered luxuries are, if given daily, stomachic bores. These things being so, I think it is only reasonable to suppose that the stomach may sicken at the alkalies when given continuously for long periods. I attach a great deal of importance to combining the spirits of chloroform with the alkali, as it certainly covers the taste, warms it, and generally makes it better borne by the patient, and perhaps those who have seen the depressing action of the alkalies have not so combined them, and hence the result; for I cannot help thinking that there must be some difference either in dose or combination, to account for our different experiences, for as I have stated before, I am in the habit of giving potash

continuously, even to middle-aged and old people, and so far as I can observe there has been a marked absence of anything like depression; nor have I seen it bring on an ammoniacal or phosphatic state of the urine, or anything approaching anæmia, or heartburn, which certainly should occur were an over-acid secretion of the stomach to be set up, but I have failed to trace any connection between pyrosis and the continuous administration of potash, and in conclusion I think that if the question is looked at fairly and impartially, it will be found to be to a large extent traditional, and not supported by unbiassed observation.

NITROGLYCERIN IN PHARMACY.

BY WILLIAM MARTINDALE, PH.D., F.C.S.

NITROGLYCERIN having been in medicinal request during the last twelve months, more stable and portable preparations of it than were formerly in use have been called for. It was discovered in 1847 by M. Sobrero, and has the composition of $(C_3H_5)'''.(NO_3)_3$, three molecules of hydroxyl in the triatomic alcohol glycerin $(C_3H_5)'''.(HO)_3$ are substituted by three molecules of the nitric radical NO_3. It may be made by Liebe's process, that given as No. 2 in Watt's *Dictionary of Chemistry.* "Half an ounce of dehydrated glycerin is poured, with constant stirring, into a mixture of two ounces of oil of vitriol and one ounce fuming nitric acid of specific gravity 1·52, the temperature of the mixture being kept below 25° C. by external cooling with ice; and as soon as oily drops begin to form on the surface the mixture is poured, with constant stirring, into fifty ounces of cold water. Nitroglycerin then separates, and may be purified by washing and drying, in small portions, in a vapour bath." Practically I have prepared several small quantities by this process, using commercial distilled glycerin, specific gravity 1·255, and nitric acid, specific gravity 1·5. Care has to be taken to add the glycerin drop by drop, noting the temperature from time to time by means of the thermometer. The nitroglycerin obtained must be well washed to free it from all traces of acidity. It at first appears as a white opaque, milky-looking, oily fluid, but on carefully drying it by exposing it in a warm room in flat dishes containing thin layers of it, it

becomes dehydrated, and forms a transparent colourless dense oily fluid of specific gravity 1·6. It is freely soluble in ether and alcohol, and to the extent of a quarter per cent. in water. It is, though slightly volatile, inodorous, and has a sweet pungent aromatic taste. It crystallises or freezes at a low temperature. It is a dangerous explosive substance. When heated with aqueous potash it is decomposed, forming glycerin and nitrate of potassium.

The 1 per cent. alcoholic solution has been the preparation generally prescribed, but hospital out-patients — workmen, labourers, &c.—I was told, found it inconvenient to carry their bottle of medicine about with them. I was therefore asked if I could present it in a more portable condition for administration, either in the form of perle or capsule. I could have got the ethereal solution put into perles, but there were great obstacles in the way, and uncertainty of getting them prepared of uniform strength. I conceived the idea that it might be soluble in oils and fats, and while preparing some nitroglycerin for alcoholic solution, I tried the experiment by putting a drop into a little almond oil, and found it dissolved almost immediately. I next tried dissolving it in melted cacao butter, and found it readily dissolved in this also. Care is necessary in dissolving it in the latter body, as the solidification of the fat is in reality a process of crystallisation ; it is necessary to take the precaution to shake the solution frequently during the process of cooling, to prevent any possible separation of the nitroglycerin, and its being unequally divided in the mass. All that is then required is to add sugar to the medicated fat, prepared of carefully adjusted strength, and roll it out into pills, to which a coating of varnish may be given.

But the pills do not act so quickly as the spirituous solution unless they are munched up in the mouth ; the quick action of the drug is often necessary in cases in which the use of nitroglycerin is needed, and, as the idea of eating pills is not a pleasant one, I thought it would be better to prepare it into lozenges or tablets; and in this I succeeded by adding the cacao butter mass to chocolate paste, mixing well with the aid of heat, and rolling out and cutting it into lozenges, carefully adjusting

the strength so as to have them containing $\frac{1}{100}$ of a grain in each. They may of course be made stronger if required. These dissolve readily in the mouth, and are as quick in action as the alcoholic solution. They are palatable—tasting only of the chocolate—portable, and stable. Nitroglycerin, although slightly volatile, seems to be fixed in an oily or fatty solution, and I think a 1 per cent. oily solution, in many cases, would be preferable to the alcoholic solution for medicinal use. It is stable, non-volatile, and not inflammable, like the alcoholic solution, and it is perfectly inexplosive—it cannot be detonated. I had hoped I had here made a discovery of some importance to the use of nitroglycerin for blasting purposes, and on searching all that I could find written on the subject, and not finding it anywhere stated that nitroglycerin was soluble in oils, I took out provisional protection for a patent for it. (This I have since allowed to lapse.) I found I could easily abstract the nitroglycerin from the oily solution again, by shaking the latter with methylated spirit; the oil sinks; on decanting the supernatant solution, and adding it to water, an opaque mixture is formed, which, on being well shaken and set aside for a few hours, deposits an oily sediment. The latter possesses all the properties of nitroglycerin—one drop of it readily detonated when struck with a hammer. Unfortunately the solubility of nitroglycerin in oils is too limited to be of service. I find I can get 15 parts by weight to dissolve in 100 parts of almond or olive oil, but 20 parts of nitroglycerin do not make a perfect solution in this quantity of oil. The 15 per cent. oily solution is perfectly inexplosive when struck, and would be quite safe for transmittance by rail or other conveyance. The nitroglycerin could not leak out of it as it has done sometimes out of dynamite. But the oily solution is too heavily handicapped, having to carry 87 per cent. of inert matter, against 25 per cent. of *Kieselguhr*—the infusorial earth in dynamite,—which this only contains in addition to nitroglycerin to make it solid, and also, as Professor Abel informs me, the *practical* objections to the use of *liquid* explosive agents led to the production of the solid preparations of nitroglycerin which are now used.

I find the nitroglycerin does not perceptibly dissolve in heavy

petroleum oil. Nitroglycerin is said to be liable to undergo spontaneous decomposition; but this, according to others, has been due to imperfect purification, or freeing it from acidity during its manufacture. I find it can be heated up to a high temperature without explosion; it then evaporates, apparently undecomposed, giving off white vapours and leaving only a slight film of brown residue. It burns with a flickering, spurting flame, and produces a hissing noise. As an explosive, nitroglycerin is now largely manufactured, not far from Glasgow, and used in the form of dynamite. Many fatal explosions of it have occurred; among the fatalities, that of Mr. Mawson, an eminent pharmacist, who had been deputed to destroy a quantity of it found in Newcastle, will be remembered.

As to its physiological action, the accounts are somewhat conflicting. I do not find any record of death from poisoning by it in this country; but I find mention of three in Sweden,[1] and of two cases of poisoning in Germany, one from "a few drops" swallowed to assist the action of gunpowder, taken for a boil. In this case the man recovered. The workmen and women engaged in its manufacture get used to its influence, and do not suffer, I am told, although they are often "up to their elbows" in it. I had an intolerable headache and sleepless night on one occasion after making a little. It was a hot day, and I had a difficulty in keeping down the temperature; more of it than usual became volatilised, although ice was carefully applied. It is surprising that 25 drops of pure nitroglycerin affected a dog so slightly,[2] and that from 10 drops given to a rabbit "no symptoms of poisoning appeared," [3] when from "a few drops" a man, with careful treatment, had a difficult recovery, or that small doses should relatively produce a much greater action than large ones.[2] These discrepancies in its action, taken with what is known respecting the chemical constitution of glycerin, would seem to suggest that possibly under the name of nitroglycerin three nitroglycerins may exist, and that not trinitroglycerin, but mononitroglycerin or dinitroglycerin, or mixtures

[1] *Biennial Retrospect of New Sydenham Society*, 1867-8, p. 453.
[2] *Medical Times and Gazette*, vol. i. 1858, p. 356.
[3] *Pharmaceutical Journal*, 1855, p. 231.

of these, may have been used. The chemistry of the subject still requires further investigation by analysis. There are two bodies[1] known, monochlordinitrin,

$$C_3H_5\begin{cases}Cl\\NO_3\\NO_3\end{cases}, \text{ and dichlormononitrin, } C_3H_5\begin{cases}Cl\\Cl\\NO_3\end{cases},$$

in which chlorine replaces one and two molecules respectively of the nitric radical in nitroglycerin. This would tend to favour the view that mono- and dinitroglycerin do exist, but as the action of the acids on glycerin is so violent, it is probable that in most cases trinitroglycerin is formed.

[1] Schorlemmer's *Chemistry of the Carbon Compounds*, p. 257.

Reviews.

Physical Examination of the Chest in Health and Disease. By REGINALD E. THOMPSON, M.D., F.R.C.P. Fcap. 8vo. pp. 260. London: Henry Renshaw.

THIS manual of auscultation and percussion is likely to be very useful. It contains a description of the anatomical relations of the thoracic viscera, well illustrated by woodcuts, and this renders the significance of physical signs in the different regions of the chest much easier of comprehension not only by students, but by those whose student's days are over, and whose anatomy has become somewhat rusty. The author, as a rule, gives a very clear account of the causation of the sounds heard in auscultation and percussion, and of the changes these undergo in disease; but occasionally his language is slightly obscure, and sometimes his account is too brief, as when he tells us that, although the occurrence of tubular or bronchial sounds in cases of solidification of the lung is usually explained by conduction, "there are many difficulties in the way of accepting this theory, and it appears to me that a simple and probable explanation may be given by the transmission of sound through rigid tubes." This statement is just enough to make one ask what the difficulties are, and wish for a fuller account of the explanation which the author approves of. The significance of each physical sign is given, so that by looking at the list of diseases in which it occurs the student may at once get a clue to the nature of the case in which he finds it, and afterwards individual diseases are discussed, and their symptoms, pathology, and signs given shortly and clearly. Under the head of regional significance of tubular or bronchial breathing, the author has omitted its occurrence in extreme congestion without inflammatory consolidation due to advanced mitral disease. In mentioning the causes of increased intensity of the cardiac sounds also the author does not distinguish sufficiently between accentuation of the second sound over the aortic and over the pulmonary valves. He mentions that accentuation of the second sound indicates increased arterial tension, but he omits one of the most important

causes of this, viz., chronic Bright's disease, which one is so often led to suspect by the accentuation of the second sound over the aortic valves in persons suffering from it. The author rightly gives the occurrence of this accentuated second sound in aortic aneurism, but students who know this and are unacquainted with the accentuation in Bright's disease are not unfrequently puzzled, and spend much time in looking for aneurisms which do not exist instead of examining the urine. We have noticed these omissions in order that they may be supplied in a future edition, which we think is sure to appear before long, as the book must command a large sale.

The Advantages and Accidents of Artificial Anæsthesia, a Manual of Anæsthetic Agents. By LAURENCE TURNBULL, M.D. 2nd Ed., Revised and Enlarged. 8vo. pp. 322. London: H. K. Lewis.

THIS work is intended to give a description of the chief anæsthetic agents, their composition, characters, medical properties, and tests of purity. Directions for employing anæsthetics, the dangers arising from each, and the precautions necessary to avoid risk are likewise given. The various forms of inhalers are discussed, and the relative mortality of anæsthetics compared. Some little space is devoted to practical hints on local anæsthesia, the internal use of anæsthetic agents, the medico-legal importance of anæsthesia, and a brief history of the discovery of anæsthesia. Much valuable information on these subjects is contained in periodical medical publications, but a great deal of this is practically lost to the bulk of the profession, who either do not see it or do not read it as it appears. It is therefore very convenient to have it digested and arranged in such a book as the present, and the favour with which it has been received is shown by the rapid sale of the first edition. In the present edition new matter has been added—the best proportion in which ether, alcohol, or chloroform should be mixed having been determined, and new experiments made on the action of anæsthetics upon the blood. It also contains additional practical hints for the safe administration of anæsthetics shortly given so as to be readily remembered in an emergency. Amongst other interesting points in the work, we notice the local use of hydrobromic ether spray as a remedy for noises in the ears, and the effect of climate on the use of chloroform, casualties from its administration being much less frequent in the Southern than the Northern States of America. The author remarks that one of the causes of this may be the greater heat of the air, and this is no doubt most important, for heat is one of the most powerful stimulants

both to the heart and respiratory nervous centre which we possess. By the application of heat death from chloral may be prevented, but this fact has been omitted in the section on chloral. The production of anæsthesia by rapid breathing, such as one uses when trying to blow up a fire, is mentioned, and its use in dentistry and short operations illustrated by cases. There is another use of this method which might have been mentioned, as it is one of the most generally useful. In examining patients by the laryngoscope when irritability of the pharynx prevents a good view from being obtained, the irritability frequently disappears if the patient is simply directed to make a few deep and rapid respirations, and the larynx can then be seen without trouble. The influence of shock as a factor in many of the so-called deaths from chloroform has, we think, not received sufficient attention, but notwithstanding these omissions, along with some carelessness in composition and a want of inverted commas to mark quotations, this work is a useful and acceptable contribution to the literature of anæsthetics.

Functional Derangements of the Liver: Being the Croonian Lectures delivered at the Royal College of Physicians in March, 1874. By the late CHARLES MURCHISON, M.D., LL.D., F.R.S. 2nd Ed. Revised by the Author. 8vo. pp. 193. London: Smith, Elder and Co.

A PERUSAL of these lectures cannot but increase the reader's regret at the untimely death of the author, for in no work on the subject is so much information compressed into so small a bulk, and yet given with so much clearness. The section on derangements of the nervous system, circulation, and respiration of the genito-urinary organs and of the skin, due to functional disorder of the liver, is especially suggestive, and may aid many a medical man to understand and treat satisfactorily cases which may have hitherto puzzled him and resisted his remedies. The book has been thoroughly revised by the author, and the work which has been done on the subject since the lectures have been given has been either incorporated or given in the form of foot-notes.

Clinic of the Month.

Arsenic in the Diseases of Children.—M. Jules Simon chiefly uses Pearson's liquid composed in the following way: arseniate of soda, 0 gr. 05; distilled water, 250; honey water, q. s. The dose is a teaspoonful or 5 grams at each meal, that is to say, 1 milligram of the arseniate of soda is administered on each occasion. M. Simon states that children bear arsenic well, and take nearly the same quantities as adults, but he cautions against giving it to children under two years of age. Arseniate of potash is given as Fowler's solution to the extent of two drops during each meal, the quantity being gradually increased until ten days is reached; when this the maximum dose per diem is attained, the quantity is reduced again to two drops. The same ascending and descending scale is continued for three weeks, after which the use of the remedy is stopped for a period of eight to ten days. This plan of treatment is often carreid on for a considerable length of time. In many cases the arseniate can only be administered in the form of a pill, the dose ranging from one to two milligrams up to one or two centigrams a day. The physiological action of arsenic in therapeutic doses upon the blood is to give it an increased respiratory function, and upon the respiration to render it more ample, calm and easy, in cases of dyspnœa. The urinary secretion is generally increased, whilst the appetite is stimulated, and the patient generally feels himself stronger and better. The chief indications for the use of arsenic are, chronic skin diseases, intermittent fevers, tuberculosis, scrofula, neuroses, and certain cases of constitutional anæmia. (*Le Progrès Médical*, October and November, 1879.)

The Hypophosphites in Phthisis.—Dr. Coghill in a critical review of the value of the hypophosphites of lime and soda, gives the results of this treatment in 100 cases taken indiscriminately, when it was fairly tried in the Royal National Hospital at Ventnor. Of these fifty-seven improved, seventeen remained in *statu quo*, twenty-six got worse, and four died. Of 328 patients otherwise treated, 240 improved, thirty-nine remained in *statu quo*, twenty-five got worse, and twenty died. It seems evident from

these statistics, says the author, that the hypophosphites have no claim whatever to the character or properties of a specific remedy in the developed stages of pulmonary consumption. In only 25 per cent of the cases could they be employed unaided, and where cases in which change of climate, improved dietetic and hygienic conditions, with general tonic treatment, would probably have shown good results. Great disappointment resulted from their impotency to check such characteristic symptoms of the disease as night-sweats, or to influence favourably the febrile conditions indicating advancing lung mischief. That however these salts have, when judiciously employed, valuable tonic properties promoting the appetite, the digestion, and assimilation more especially of fatty food, was strongly impressed on all. They have certainly no specific influence, so far as the author can form an opinion after the most careful and unbiassed observation, either in arresting when in progress, or promoting repair when stayed, the several forms of pulmonary phthisis, whether tubercular or pneumonic. Although by no means specific in the tubercular diathesis, Dr. Coghill values the hypophosphites of soda very highly as a nervine tonic and even as a tissue-builder. (*The London Medical Record,* Oct. 15, 1879.)

On the Prolonged Antiseptic Bath.—Prof. Verneuil, in an article in the *Arch. Générales* for July and Aug., relates several cases illustrating the value of antiseptic baths. The bath is to be of a medium temperature, which is to be regulated by the patient himself in such a manner that it feels to him neither too hot nor too cold. It may be taken in bed, either in the sitting position or with the shoulders propped up; or if the patient is sufficiently strong, he may sit in a chair. The application should be continued for two or three hours daily. Disinfecting solutions of either chloride of soda of Labarraque, 10-20, and carbolic acid, or hydrate of chloral to the extent of 1-2 per cent., varying the doses according to the effects desired to be produced, and the duration of the immersion, may be advantageously added to the baths. Prof. Verneuil terminates his paper with the following conclusions:—"The prolonged and repeated antiseptic bath is of the utmost use in a great number of surgical affections of the hand, fore-arm, and elbow. It prevents traumatic fever almost certainly in cases of recent accidental or operative wounds seated in healthy tissue, and in this respect rivals the classical continuous irrigation and the wadding dressing. It possesses the same preventive property in cases of operations practised in the midst of more or less old morbid centres (*foyers*) impregnated with purulent and putrid substances, and thus renders more

innocent excisions and extirpations of bones, amputations in gangrene, drainage, counter-openings, &c. In this respect it is very superior to rival modes of dressing. Finally, it possseses still more than these the inestimable power of arresting acute or chronic septicæmia by so modifying recent or old pathological centres that the production or the penetration of the septic poison is prevented, or at least impeded. The preventive or curative action of the antiseptic bath on surgical fevers enables us to study with care and profit the qualities and actions of the poison concealed in wounds, and to dissipate some of the obscurity which still prevails in the doctrine of septicæmia." (*The Med. Times and Gazette*, Sept. 6, 1879.)

Salicylic Acid in the Treatment of Diabetes.—Dr. Schaetzke publishes in the *Berliner klin. Wochenschr.* for June 2nd, 1879, the history of three cases of diabetes successfully treated by salicylic acid. The first case was that of a lady, aged fifty, who had for eighteen months been under treatment for chronic gastric catarrh. Her father, sister, and husband had died of tuberculosis. When she was seen by the author, he at once suspected diabetes from the excessive thirst, polyuria, caries of the teeth, &c. The urine was examined and found to contain sugar; the specific gravity was 1038. The patient was treated with salicylic acid, 3 grammes (45½ grains) being ordered to be taken three times daily for three days. On the first day, however, she felt giddy, and had nausea. On the second day she vomited once, her hearing was affected, and her gait became unsteady. The dose was therefore reduced from 9 grammes daily to 3 grammes. Owing to her intolerance of salicylic acid, Herr Schaetzke sent her to Carlsbad. On her arrival there the urine was found to be perfectly free from sugar, and remained thus both during her cure and afterwards. The second case was that of a man, aged fifty-eight, who probably had been suffering from diabetes for the last two years. The urine contained a considerable percentage of sugar. As the patient could not be prevailed upon to go to Carlsbad, he drank the waters at home, but without much benefit. Herr Schaetzke again resolved to try the salicylic acid, beginning, as in the first case, with 3 grammes three times a day. This patient also evinced great intolerance of the drug. It was, however, continued for two weeks, in doses of 3 grammes daily during the first week and 2 grammes during the second week, when the sugar disappeared from the urine and did not reappear. The other case was that of a girl, aged twenty-six, who had been suffering from colic for years. She was treated in the same way as the other patients, but was obliged to discontinue the

treatment after the first four days, owing to her intolerance of the drug. A week later another attempt was made with a dose of 2 grammes daily; this was continued for a fortnight, when the urine remained free from sugar. It is curious that in every one of these cases the patients should have been so intolerant of the salicylic acid. Could this phenomenon be in any way connected with their disease? and if so, in what way? Three cases can scarcely be regarded sufficient to establish the reputation of salicylic acid as a cure for diabetes, but the subject is worthy of being investigated. (*British Medical Journal*, Oct. 11, 1879.)

The Treatment of Scabies.—Dr. Liveing believes that the most common error in regard to the treatment of scabies is that of using the sulphur ointment too strong, and of continuing its use for too long a period. Of all remedies not one is so effectual as sulphur ointment properly applied. An ointment half the strength of that of the *British Pharmacopœia* is quite strong enough, and the best time to use it is at night, when it should be rubbed all over the body, except the head, but especially on the hands, buttocks, and lower parts of the abdomen. The underclothing used during the previous day, namely, the socks, gloves, drawers, and jersey should be worn during the night; this thoroughly disinfects the clothes, and at the same time keeps the ointment well applied to the skin. In the morning a warm bath may be taken, and no treatment followed during the day. For three nights this process should be repeated, but never longer; subsequently a little ointment should be well rubbed on the hands, wrists, and buttocks for a few nights. All treatment should then be discontinued for at least a week, when, if necessary, it may be repeated for one or two nights, or a milder ointment may be used. It is sometimes difficult to say whether a case of scabies is cured or not; under these circumstances it is very convenient to use an ointment which does not irritate or annoy the patient by its disagreeable smell, and which at the same time will complete the cure. A most excellent ointment of this kind is made with balsam of Peru (ʒij ad ℥j). The styrax ointment is also thoroughly effective, but less agreeable. With regard to sulphur baths, Dr. Liveing states that they are not nearly so effective as sulphur ointments. He lately ordered sulphur baths (as being more agreeable than ointment) for a pupil of his own who was suffering from scabies; six or seven were taken, and the patient then returned much better but not cured; more baths were ordered, but the patient did not again present himself. He had in all fifteen baths, and then went home to the country thinking

himself cured; unfortunately he was not, and he conveyed scabies to his family. This is not the first time that sulphur baths have been found to fail. They are, however, useful under certain circumstances, as in cases where it is very inconvenient to apply sulphur ointment at night. Again, in cases where there is much secondary eczema set up with extensive excoriations, the application of sulphur ointment is very irritating. Under these circumstances it is very useful to begin with a few baths, which generally produce an excellent effect. They may be followed up by the application of ointment to those regions known to be specially affected. Lastly, with regard to disinfecting outer clothes and bedding, it can easily be done by sulphur fumigation or baking. In all cases of long standing the clothes, blankets, &c., should be disinfected, but it is unnecessary to extend this to the bed itself. (*The British Medical Journal*, Oct. 25, 1879.)

On the direct Application of Oxygen to Ulcerating Surfaces.—Dr. Goolden advocates the direct application of oxygen to ulcerating surfaces. He has lately had two opportunities of putting this plan of treatment into effect. The first patient was suffering from sphagenic ulceration of the throat, which there was reason to suppose was syphilitic in origin. The affection was progressing with great rapidity, and in a very few days had destroyed the uvula and the greater portion of the soft palate. What was left of the palate was of a bright crimson colour, with elevated edges, discharging some dirty cream-like matter; the breath was very offensive, and she could neither speak intelligibly nor swallow liquid, which regurgitated through the nose. Instead of the usual treatment of the inhalation of the fumes of oxide of mercury given off from hot iron when the mercury and oxygen are decomposed, the mercury remaining behind, whilst the oxygen rises up through the inhaling tube, Dr. Goolden caused the patient to inhale pure oxygen. The result was most satisfactory, the destructive processes were arrested, and the remnants of the soft palate assumed a healthy character, and healed, whilst within a fortnight some of the palate was operated on, and a metallic plate supplied. In a second similar case, equally satisfactory results were obtained from the inhalation of the gas. The oxygen may be prepared without heat by mixing permanganate of potash and peroxide of hydrogen. The latter material however is decomposed at a temperature which does not exceed that of an ordinary hot summer's day; the bottle which contains it must therefore be kept in a cool and dark place. (*The Lancet*, Oct. 25, 1879.)

The Treatment of Diphtheria.—Dr. Gurney, after a very large experience in the treatment of diphtheria offers the following observation upon this very serious disease of the throat. The stiffness in the neck, the disturbance of the circulation, and the rapid rise of temperature before any affection of the throat is observed, point to the fact that the disease is a blood poison calling for prompt and decisive treatment Diphtheria tends to kill by suffocation and by its poison exhausting the vital energy. Suffocation may be either accidental or as a natural result of the throat affection—accidental if when the membrane is thrown off it becomes lodged in the larynx; natural if the swelling inside the throat shuts off the supply of air to the lungs. Nature may overcome the disease if the strength be kept up, and the deposits arrested. Acting upon this hypothesis, the arrest of the disease and nutritious support are the points chiefly to be regarded in the treatment. To succeed in this, Dr. Gurney uses a respirator of the ordinary size and shape, the front of which is minutely perforated. Inside the respirator two or three perforated plates are inserted, between which common tow, not cotton-wool, is inserted; on each of the layers of tow ten to twenty drops of a solution of carbolic acid, creosote, and turpentine is then dropped. Should the patient tire of these, turpentine or iodine may be substituted. The respirator is then placed over the mouth, and is kept continually applied. The patient is also provided with warm moist air by means of two kettles kept boiling on the fire. Attached to the spouts of the kettles is an elastic tube of an inch calibre, at the end of which is a spray-like nozzle, which is fixed immediately under the mouth of the patient. By this means the disinfectant remedies are carried moist to the throat, whilst the moist air acts as an excellent sedative to the pain. An active purge is also given to remove offensive stools of effete or poisonous nature. Internally aconite is given in frequent but small doses—two to four minims of the tincture; at the same time the strength is supported with milk, cream, and eggs, with or without brandy, and beef-tea *ad libitum*. As a drink patients are recommended to take as much chlorate of potash in solution as they can without vomiting. The chlorate of potash is highly beneficial in all cases of a low typhoid type; but if it is objected to, the juice of lemon, which is by many thought to be a specific for diphtheria, may be employed in its stead. Should the system be very weak, belladonna is prescribed in place of the aconite, but better results are obtained with the latter. As soon as the urgent symptoms have subsided, strychnia with or without nitro-hydrochloric acid, is ordered, as it is not only the best tonic, but because it prevents the paralysis which so often

follows diphtheria. Dr. Gurney has found the treatment here indicated is highly beneficial, but knowing the tendency there is to rheumatism after this terrible disease, he invariably employs the bicarbonate of potash. (*The Lancet*, Oct. 25, 1879.)

Scillaïn.—Herr v. M. V. Jarmersted (*Archiv für Exp. Path. und Pharmak.* xi. p. 22) proposes this name for a new alkaloid, the extract of Urginia Scilla, of which it represents a large part of the active elements. It is a white or yellowish matter without smell, bitter, slightly soluble in water, ether, and chloroform, very soluble in alcohol. It reduces Barreswil's liquor, and is transformed by heat into a resinous mass, which decomposes easily. It dissolves in concentrated hydrochloric acid, to which it gives a bright red tint, vanishing when heat is applied. It also gives a fluorescent brown colour to sulphuric acid, passing to red on the addition of bromide of potassium. This new product, which is the only one meriting the name of alkaloid of squill, has not hitherto been employed in medicine. Experiments made on animals show that, in large doses, it brings on diarrhœa and sickness, and that it exercises an entirely special action on the heart. In the first stage, there is an elevation of the blood-pressure, with diminution of the frequency of the pulse; in the second period, there is, on the contrary, diminution of the pressure and increase of the frequency of the pulse. Its physiological effects being exactly those of digitalis, the conclusion is, that the diuretic action of squill can only be produced in cases in which the difficulty of diuresis is in connection with disorder of the circulation. (*The British Med. Journ.*, November 1, 1879.)

Nitrite of Amyl in Uterine Hæmorrhage.—Dr. Kerr reports a case of severe post-partum uterine hæmorrhage, in which the patient was restored from a state of collapse by the inhalation of five minims of nitrite of amyl, whilst the hæmorrhage was immediately arrested. The author was led to adopt this method of treatment by the report of Dr. Koehler's use of warm fomentations to the head in cases of uterine hæmorrhage, to prevent anæmia of the brain and of the heart. In either case the *rationale* of the treatment is probably to be found in the rapid dilatation of the cerebral vessels. (*The British Med. Journ.* Nov. 1, 1879.)

Antiseptics in Ozæna.—Dr. Lennox Brown has employed solutions of thymol (5 grains in 12 fluid ounces of water, with a little glycerin and rectified spirit diluted to one quarter its strength) as a nasal douche, and as a gargle in cases of ozæna.

But even with such a dilute solution as the one here employed the thymol caused so much smarting and irritation that its use was discontinued. Salicylic acid was therefore tried in the following form:—Salicylic acid 2 drachms, rectified spirit 10 drachms, and 1 fluid drachm of this solution (representing 10 grains of the acid) to half a pint of tepid water; in other words, about 1 part in 500 made an agreeable, non-irritating, and efficient gargle or nasal douche, for use with the post-nasal syringe, but did not serve with the ordinary anterior douche, because the specific gravity of the fluid was not sufficiently great. The following was therefore employed:—Borax, 3 drachms; salicylic acid, 2 drachms; glycerin, 2·5 ounces; water, to 3 ounces. One or two drachms of this mixture to the half pint of water at 95° F. acted quite efficiently, whether used with the anterior or post-nasal douche, or as a gargle, and this form has now been in use for many months. It has, besides its antiseptic qualities, the advantage of being non-irritating and of agreeable flavour. The remedies here indicated are of especial use in cases of syphilitic ulceration. In many patients, however, the ozæna arises from catarrhal inspiration, retention, and consequent putrefaction of the normal secretion. In such cases a solution of chloride of ammonium and borax (about 10 grains of each to the half-pint of water) acts admirably in clearing away the offensive accumulation, and in restoring the mucous membrane to healthy secretion. In all cases of ozæna, however, of whatever kind, it is important to keep the passages as moist as possible, so as to prevent re-incrustation between the periods of using the douche, and for this purpose the interior of the nostrils should be well anointed with vaselin, containing about five grains of iodoform to the ounce. (*The British Med. Journ.* Nov. 1, 1879.)

The Treatment of Ringworm.—Dr. Robert Liveing divides the remedies for ringworm into two classes: (1) those which act by setting up sufficient inflammation in the skin to lead to the destruction of the disease; (2) those of a milder kind which act simply as antagonistic to the development of the Trichophyton tonsurans. To the former class belong such remedies as acetum cantharides and strong acetic acid; to the latter belong sulphur ointment, the white precipitate ointment, and sulphurous acid lotion. Many remedies combine, as it were, these two properties; as for example chrysophanic acid ointment, iodine liniment, and strong carbolised glycerin. Circumstances must guide the choice of remedies, and the age of the patient, together with the extent of the mischief, must be taken into consideration. Strong measures are always contra-

indicated in the case of very young children; a little tincture of iodine painted on once a day for a few days, followed by the use of the white precipitate ointment, is all that is necessary. In older children stronger treatment must be used, but even then the extent of the mischief must be taken into consideration. It is very unwise to make a large sore place on the scalp, as it is likely to give rise to more trouble than the ringworm itself. If, however, the disease is in an early stage, and consists of one or two small circumscribed spots, it is best to cut the hair short all round the spots, and to apply with a brush Coster's paste, acetum cantharides, or iodine liniment. At this stage a few applications will sometimes arrest the mischief. A single painting with pure carbolic acid is thoroughly effective; but it is a strong remedy, and gives some pain. When the disease extends over a large surface, milder measures must be employed—tincture of iodine of double strength, painted on every day, is a good and safe mode of treatment. This may be followed up by the use of the nitrate of mercury ointment, diluted according to circumstances, or an ointment containing the red and white precipitate of mercury and sulphur, or the oleate of mercury (10 per cent.) Goa powder or chrysophanic acid ointment (30 grains to the ounce) has been found to be a very effective remedy, but there are great drawbacks to its general use. First, it stains everything with which it comes in contact; and secondly, the amount of inflammation which it may set up is uncertain. Some children bear it well, whilst in others it produces so much irritation and discoloration of the skin as to alarm those who use it. It must therefore be employed with caution, and patients should be warned of its properties; nevertheless it is a very effective remedy. Success in the treatment of ringworm depends upon the judicious selection of remedies, the circumstances of the case guiding the choice. A certain number of cases will defy all remedies, however, whatever treatment is adopted, and will recover only after years of tedious care. As a rule, shaving the head is unnecessary, but the hair should be kept quite short. Skull-caps are best avoided, as liable to propagate the disease. Epilation—although largely used in France—is not often necessary. Lastly, most observers agree that ringworm is often associated with a generally unhealthy condition of the skin, which is badly nourished. Under these circumstances tonics, such as iron and arsenic, are often useful. This is quite in accordance with the fact that many strictly local affections are influenced by general treatment. (*The Lancet*, Nov. 1, 1879.)

Extracts from British and Foreign Journals.

The Value of Warm Water in Surgery.—Dr. Goelet illustrates by cases the value of the use of warm water in erysipelas, especially traumatic; lacerated and contused wounds in general, but especially those of the scalp, which are so prone to take on erysipelas, and those of compound fractures, gunshot wounds, and traumatic gangrene. The warm water may be applied in two ways, 1st, by means of the water bath, in which case the limb is submerged in water kept constantly at the same temperature (generally about 100° F.), disinfected when so desired, and changed as often as necessary, about twice a day will generally suffice; 2nd, by means of hot fomentations, which consist of a layer of cotton batting, or two thicknesses of sheet lint, saturated with hot water (previously disinfected if so desired), applied closely and evenly to the part, and kept at a constant temperature by a covering of oiled silk. In this case it will be necessary to re-wet the dressing about every two hours, and change it twice a day, or oftener in cases where there is profuse suppuration. In cases of erysipelas the dressing must extend a little beyond the limit of inflammation. (*The American Journal of the Medical Sciences*, July, 1879.)

Iodoform as an External Antipyretic.—Dr. Coesfeld, acting upon the observation that the external application of iodoform dissolved in collodion produces a marked diminution of the body temperature, which is persistent when the application is continued for some time, has employed it in phthisis. The patient was suffering from a tuberculous infiltration of the whole left lung. The iodoform collodion with a sufficient quantity of oleum menthæ was spread over the left anterior wall of the chest to relieve vague pains which were felt there. The solution employed was not the ordinary 10 per cent., but one containing 33·3 per cent. After the application the temperature, which had hitherto been 39°·1 in the morning and 39°·5 in the evening, fell to such an extent, that within six hours, in spite of the evening exacerbation of the fever, a fall of temperature to the extent of 2°·7 was registered, and twenty-four hours later the

temperature was still 2°·1 below its ordinary point. The application of a 10 per cent. solution did not produce this fall, though a 20 per cent. solution brought on the expected lowering. No unpleasant collateral effects upon the respiration, circulation, or digestion were experienced. (*Deutsch. med. Wochenschr.*, 1879, No. 23; *Med. chir. Rundschau*, July 1879.)

Traumatic Herpes of Dental Origin.—M. David reported to the French Academy of Medicine three cases of traumatic herpes occurring upon the cheek and gums after operations or other dental lesions. The author proceeded to notice the extremely slight injury which in two of the cases produced the eruption. The pathogeny of this affection, whose history is not completely known, is of importance. In two of the cases a general malaise was experienced before the appearance of the herpes; there were also marked febrile indications, which clearly showed the general character of the affection. In two cases at least, then, M. David rejects the theory put forward by M. Verneuil, viz.: the calling into existence of a constitutional influence; he saw, in other words, only a simple case of febrile herpes. In the third case, the eruption occurred several times upon the gums after inflammation of a portion of the mucous membrane above the wisdom teeth, the inflammation being produced during the cutting of these teeth: that is to say, it was due to a particular complication caused by the cutting of the wisdom teeth. The observation is interesting, as it explains to a certain extent the nature of aphthæ, which some authors, apparently with reason, have called herpes of the mucous membrane. The conclusions which have been arrived at in regard to this subject are: (1) Some of the vesicular eruptions of traumatic origin may be regarded as the result and critical sign of the fever which preceded their appearance. This may be allowed whilst the initial cause is understood to be the wound itself. (2) An herpetic fever, as stated by M. Parrot, actually exists. (3) Wounds, and the various operations performed upon the teeth and in the mouth generally, may be considered sufficient to produce herpetic fever or herpes in the usual sense of the word. (*Le Progrès Médical*, Sept. 13, 1879.)

The Treatment of Typhoid Fever.—Dr. Dale recommends the use of muriatic acid in the treatment of typhoid fever. He commences with the acid at the very beginning of the disease, giving to an adult ten drops of the dilute muriatic acid of the pharmacopœia every two hours. The acid should be given in an ounce or more of water, sweetened, if the patient prefers it; and to prevent injury to the teeth it should be taken through a straw or glass tube, or the mouth should be rinsed

with a solution of soda. The acid is to be continued through the whole course of the disease, but at the beginning of convalescence the interval between the doses may be increased. The tongue affords the best indications as to the proper method of giving it. Thus if the tongue cleans and remains moist, and the digestion is good, with no diarrhœa or abdominal tenderness, the acid is no longer indicated; but if the tongue becomes dry, or furred, it is again immediately administered. If headache is a permanent symptom at the beginning of the disease, cold applications to the forehead, bromide of potassium, and in very severe cases, cups to the nape of the neck, are used. Diarrhœa can generally be controlled by small doses of Dover's powder or morphia, and if necessary kino, or some other astringent, may be added; should the discharges be bloody, sugar of lead is given; and when the diarrhœa is obstinate injections of laudanum into the rectum are beneficial. Adding lime-water to the milk given is very serviceable in diarrhœa. It is absolutely necessary to feed fevers, and if the patients can take it, both milk and weak chicken-broth or beef-tea may be given. If thirst is excessive, it is best to relieve it by giving bits of ice to be dissolved in the mouth. Stimulants, sometimes in large quantities, are specially indicated where there is much nervous prostration, and in severe cases they should be given, at as early a stage as can be borne. Quinine is the best tonic in typhoid fever; one or two grains of the sulphate may be given with every alternate dose of muriatic acid. It is often necessary, on account of disturbing the stomach or increasing the diarrhœa, to add to it an opiate. When the morning temperature remains persistently high, large doses of quinine, from 10 to 20 grains, repeated two or three times a day, will nearly always reduce it. Good nursing is of the greatest value in this disease. The staple remedies therefore employed by Dr. Dale are muriatic acid, milk, beef-tea, alcohol, and quinine, the last two not being required in mild cases. He moreover believes that judicious medication is very essential, and that it is necessary above all things to avoid many drugs. To individuals such as nurses and attendants upon the patient, who complain of the premonitory symptoms of typhoid fever, Dr. Dale prescribes an emetic; or 3 grains of quinine repeated every two or three hours until it affects the head, the dose being then reduced to 4 or 6 grains daily. About half the cases treated in this way recovered in a few days, and the remainder had fever in a mild form. (*The Boston Med. and Surg. Journal*, July 26, 1879.)

Treatment of Round Worms.—Reduce 30 to 50 grams of the sem. cucurb. pepo to a fine powder, and make it into an

emulsion with 300 to 500 c.c. of water. Order a fourth-part to be taken at night. On the following morning administer 5 pills of the extract punic. granat. If necessary repeat this treatment for five successive days. In the intervals the rest of the emulsion may be taken. (*Pharmac. Ztg. Apothek. Block in Eppendaff*, xxiv. 16; *Der practische Arzt*, Feb. 1879.)

An Agreeable Method of taking Castor-Oil.—Dr. Starcke recommends the following as a simple means for making castor-oil palatable. The oil is to be mixed with a sufficient quantity of coarsely-powdered sugar to form a thick kneadable paste. For this purpose three parts of sugar are generally required for one part of the oil. To this paste a pleasant taste may be imparted by the addition of powdered cinnamon or grated lemon peel; children are so pleased with the white sugar paste that they quarrel for the privilege of licking out the spoon. For adults the mass should be wrapped up in a wafer to conceal every trace of the oil, but as the quantity which has then to be taken is so large, the author prefers to limit this method of administration to the cases of children. In place of sugar Dr. Starcke has employed Pulvis glycyr. compos. which forms a paste when added to the oil in the proportion of 1:2. The paste is put on the tongue as a bolus, and is swallowed with water. In both cases before taking it the oil may be left in a refrigerator or under a stream of water to become firmer, but even without any previous preparation the oil may be readily solidified, and may then be taken without nausea by adults. (*Berl. klin. Wochenschr.*, No. 16, 1879; *Med. chir. Rundsch.*, Aug. 1879.)

Cold Clysters.—J. Lapin has continued the investigations of Folty, Ruthenberg, Boyer and Schlykowa, upon the antipyretic action of cold clysters. The experiments were made upon patients suffering from fever, upon those who had no fever, and upon those who were healthy. The temperature was taken in the axilla whilst the patient lay on his back, as well as in the rectum and in the hypogastric region. The clyster of one litre of water at 5° or 10° C. was then administered, and the temperature was again noted after the water had been ejected. From this method of experiment the following results were obtained. (1) The cold clyster is an active agent in lowering the temperature, its results being tolerably persistent; (2) Clysters of 10° C. were in every case well borne by the patients, and sometimes left behind them an agreeable sense of invigoration extending over the whole body, though in other cases they induced unpleasant sensations in the abdomen. In patients suffering from recurrent fever they even produced shivering.

(3) The diminution in the temperature which occurs after the administration of cold clysters is greater in feverish patients than in those who are free from fever or who are healthy. (4) Cold clysters not only lower the temperature, but also affect the pulse and respiration to a considerable extent. (5) The most marked diminution is noticed in the rectum and then in the hypogastric region, whilst the least fall is in the temperature of the axilla. (6) Defæcation follows the use of cold clysters at variable times in different persons. (7) It is certain that the cold is preferable to the warm clyster in all cases in which an enema is merely required for the purpose of emptying the bowels in non-febrile patients. This is especially the case when it is desirable that these intestines should exercise a tonic action after the evacuation, or that it should be followed by a diminished supply of blood to the pelvic organs. (8) The advantage of the cold clyster over more energetic antipyretic means, such as quinine, alcohol, sodium, salicylate, and other tonics, consists apart from its simple application in the fact that it fulfils other indications besides that of lowering the temperature. (*a*) It removes the stagnation of masses of fæces, which are so frequently met with in feverish patients; (*b*) It contributes to the removal of gases, and diminishes meteorism; (*c*) By these means it causes the diaphragm to move with greater freedom, and enables the organism to remove the sources of its self-poisoning by means of the intestinal gases, a poisoning which must occur if only to a small extent at each stoppage in the movement of the fæces onwards; (*d*) Cold clysters consequently lessen to a certain extent the afflux of blood from the intestine to the neighbouring organs, such as the uterus and urinary bladder. (*St. Petersburg Med. Wochenschr.*, 1879, No. 22; *Med. chir. Rundschau*, Aug. 1879.)

Albuminose or Pepton for Intravenous Alimentation.—Dr. Fowler suggests that digested albumin, the result of the action of gastric juice upon albuminous substances, should be used for intravenous injection to sustain nutrition. The substance may be obtained from finely-chopped beef by continuous boiling for forty-eight hours or more under pressure, with a weak solution of hydrochloric acid. Dr. Fowler has experimented upon several animals, and has injected large quantities into cats and rabbits, and in each instance it has been assimilated, that is to say, it did not reappear in the urine. The material has also been successfully employed to the extent of ℥iij. of the solution injected into the median cephalic vein of a patient suffering from severe hæmorrhage due to cancer of the uterus. (*The New York Med. Record*, July 5, 1879.)

New Remedies.—Dr. J. J. Mulheron of Detroit gives additional testimony on the value of *Eucalyptus globulus* in subacute cystitis. He uses it in doses of ♏xx of the fluid extract every four hours. Dr. A. S. Rochwell of New York reviews the history of *Viburnum prunifolium*, or black haw, and as the result of the experience of himself and others endorses its use in certain kinds of dysmenorrhœa. The cases in which the drug is indicated are those of delicate nervous women in whom the pain is due to slight flexions, slight endocervicitis, and partial stenosis, or where it is neuralgic in character. Black haw may be classed as an anodyne, antispasmodic, and tonic. It is given in infusion, tincture, or fluid extract, the dose of the latter being about ʒss. every one to three hours. Dr. John B. Rice relates a case in which the tincture of *Thuja occidentalis* seemed to cure an epithelioma of the lip. The patient took fourteen drachms daily. This drug was first brought into prominence by Dr. J. R. Leaming of New York, in 1877, and he had had similar successful results in his own practice. It is not pretended that it is always a specific, but it frequently appears to be very beneficial, and occasionally even curative, in these affections. The new laxative *Cascara sagrada*, about which there has been considerable difference of opinion in western journals, seems to be taking its place as a tolerably useful remedy. (*The New York Medical Record*, August 30, 1879.)

The Treatment of Psoriasis.—Dr. E. Preissmann of Nikolaeff (South Russia), states that in the treatment of psoriasis, as in many other severe diseases of the skin, it is of the utmost importance to remove crusts, scabs, scurf, &c., before the application of any remedy. In psoriasis especially, for the medicine to be of any use, it is necessary that the corium should be exposed. The Viennese School owe their splendid results chiefly to the strict observance of this rule. The removal of scabs, &c., is here ensured by thorough soaking in baths and by douches. It is however a troublesome process, attended by great difficulties in private practice, and is often impracticable. The affected part too is often, as for example in the hairy scalp, situated beyond the reach of baths. Dr. Preissmann, therefore, recommends in place of baths, douches and the maceration process generally, the rubbing of the scabby or scaly parts with an alcoholic solution of salicylic acid. This solution is to be made as follows:—

℞. Acid Salicylic. . . . . 6·0.
Spirit. Vin. rectif. . . 100·0.

M.D.S. For external application. Moistened with this solution

a moderate sized piece of lint is to be made into a ball, and then rubbed upon the affected spot. The scabs will in this way be loosened, and will fall off. To the places thus cleansed the remedy (Ol. junip. empyr. acid. chrysophan.) may be applied, when it will act with greater certainty, as the oily exudations have been previously removed by the spirit. The salicylic acid solution is of great service also in many other diseases of the skin: Prurigo, Pityriasis, Chloasma, Lentigines, &c. (*Wiener Presse*, No. 16: *Der praktische Arzt*, April, 1879.)

Damiana as a Nerve Tonic.—Dr. Polk believes that damiana is of great value in sexual debility, and that it is a nerve tonic impressing the brain and nerve centres very much in the same way that strychnia does. It has, however, no poisonous properties, whilst it excites nerve-cell nutrition, enabling the nerve-cell to assimilate its proper pabulum from the blood. It appears to possess a special affinity for the medulla oblongata and the medulla spinalis, whilst the motor seem to be more impressed by its influence than the sensory nerves. Dr. Polk has therefore been led to try damiana in hemiplegia and in paraplegia; in both cases he has found that its administration was beneficial. In several cases of severe nervous exhaustion the use of damiana in combination with the hypophosphites has been exceedingly useful; in conjunction with extract of malt also it may be successfully exhibited in malnutrition and general cachexia. The capacity for both physical and intellectual labour is also increased by the use of this combination. In preparing the fluid extract, which is the preparation chiefly to be used, care must be taken not to apply too much heat, as a high temperature is as fatal to damiana as it is to wild cherry. (*The Virginia Med. Monthly*, Feb. 1879.)

Observations on Delirium Tremens.—Dr. Näcke, of Dresden, finds that in a great number of cases the attack originates in a severe fit of intoxication, or in an epileptic seizure. Wine and beer are less frequently the cause of delirium tremens than schnaps, and the disease is therefore most common in brandy-drinking countries, such as America, Russia, &c. The most dangerous spirit in this respect is, apparently, that obtained from potatoes, probably because of the amylic alcohol which it contains in the form of fusel oil. Persons who drink different kinds of spirit appear to be more liable to attacks of delirium tremens than those who confine their potations to a single variety. The disease is most frequent in persons between the ages of 30 and 50, the greatest number of cases occurring at 35 to 40 years of age; the youngest patient who came under obser-

vation was 18. As regards the season, the attacks are most common in the latter part of autumn, and then in summer. Five per cent. of the cases in Königsberg were suffering from delirium tremens incipiens, an abortive form. In another form, that of chronic delirium tremens, the attack may last for weeks or months; it then consists of abortive stages in relation with an acute attack and intervals of rest. The attack is often accompanied by an increased secretion of sweat and by a great thirst, but Dr. Näcke has been unable to observe any characteristic appearance in the pupil. Gastritis is important as leading to a correct prognosis. Slight feverishness was observed, and in about one-third of the cases the temperature rose to 38°·8 C. The pulse and respiration were not greatly increased. Albuminuria, excluding that due to diseases of the kidney and heart, occurred in 82 per cent. of the cases, the albumin being present from the merest trace up to very large quantities. In one-fourth of the cases the albuminuria was transitory and disappeared with the fever, but it was not always proportionate to the strength of the delirium. Chemical investigations appear to show that at the commencement of the attack there is an abnormal diminution in the amount of phosphorus excreted. This may be explained upon the assumption that the metabolism of the central nervous system is lessened during the first stages of the disease. The illusions are generally due to hallucinations of the senses of sight and hearing, rarely to those of taste or common sensation. The appearances of animals only occurred in one-third of a large number of cases, and they were not then confined to small, but included also large beasts; all the symptoms are increased towards the evening. Relapses may occur during convalescence. It is impossible to give a fixed rate of mortality, as the number of deaths varies from time to time in the same place. The first attack is the most dangerous. Post-mortem examination does not reveal any characteristic appearances. Narcotics should be given from the first in moderate doses. Three to five grams of chloral in two doses were usually sufficient to produce sleep, but at a later period the dose has generally to be repeated. Strait jackets and mechanical means are to be avoided, as they give rise to numerous illusions. A well-warmed and separate room, and an indestructible bed, are the best remedies. (*Centralbl. f. d. med. Wiss.*, June 24, 1879.)

Conversion of Calomel into Corrosive Sublimate.—Two cases have been observed presenting all the characters of corrosive sublimate poisoning after the use of powders composed of calomel and sugar, which had been prepared for some time.

As it was possible that the corrosive sublimate in these cases was formed from the calomel by the action of the sugar or some substances contained in it as an impurity, experiments were made to discover the conditions under which the mercurous is converted into the mercuric compound. Dr. Slop finds as the results of his experiments, that corrosive sublimate is formed in the presence of hydrochloric acid, organic acids, chlorides of the alkalies, and carbonates of the alkaline earths, the latter being specially important on account of the frequency with which calomel is dispensed with magnesia. On examining several specimens of calomel pastilles, having sugar for their basis, and which had been made for more than a month, he found some to contain a considerable quantity of corrosive sublimate, whilst others did not show a trace. He attributes these differences to the fact that the latter had been prepared with a neutral refined sugar, while for the former raw sugars, which are often acid (colonial sugar), or alkaline (beet-root sugar), on account of the hydrate of lime which they contain (introduced in the neutralisation and clearing of the juice), had been employed. He thinks that it is by the action of these impurities in the calomel that corrosive sublimate is formed. M. Jolly found that corrosive sublimate was formed in mixtures of calomel and raw sugar, and he too attributes this to the impurities which the raw sugar contains. Dr. G. Vulpius has also experimented upon this subject. Mr. Langbeck doubts whether well-washed calomel mixed with perfectly dried sugar, and kept in a stoppered coloured bottle, will undergo a change into corrosive sublimate, and he has made some experiments which confirm him in this opinion. (*The Bost. Med. and Surg. Journal*, Aug. 28, 1879.)

On the Pathogenetic Conditions of Albuminuria.—Dr. Runeberg, in a treatise on the cause and origin of albuminuria, based upon clinical and experimental results, comes to the following conclusions. The transudation of seralbumin in the urine takes place in the glomeruli. It is due to an increased permeability of the capillary walls and of the investing epithelium. The particles of albumin suspended in the blood plasma which are unable, under normal conditions, to pass through the membranes of the glomeruli, are consequently in part able to filter through with the other constituents of the urine. This increased permeability also takes place in the normal kidney whenever there occurs a marked diminution in the difference between the blood-pressure in the glomeruli and the pressure which prevails in the urinary tubules. This accidental or transitory albuminuria will appear whenever there is a marked lessening of the blood-pressure in the glomeruli, or when there

is an increase of pressure in the urinary tubules, or from both these causes combined. In chronic albuminuria the increased permeability of the filtering membrane is due to an inflammatory or degeneration process, occurring in the capillary plexuses of the glomeruli, which affects the conditions of pressure, and more especially those of permeability. Some albumins, as, for instance, ovalbumin and hæmoglobin, are more capable of filtration than others, such as seralbumin; when, therefore, these albumins are mixed in the plasma of the blood, they are soon filtered off with the soluble salts even in the normal conditions of blood-pressure and in healthy kidneys, and they then appear in the urine. (*Med. Chir. Rundschau*, Aug. 1879.)

The Evidence of Still Birth.—Dr. Abbott, after an elaborate and careful consideration of all the points in connection with this subject sums up the results of his investigation in the following words:—"The medical examiner may infer that a child has lived during and after its birth (1) when the diaphragm reaches only to the fifth intercostal space; (2) when the lungs more or less completely fill the thorax; (3) when the ground colour of the lungs is broken by insular marblings; (4) when by careful experiment the lungs are found to be incapable of floating; (5) when a bloody froth exudes from the cut surfaces of the lungs on pressure; (6) when the air-cells are visible to the naked eye. These proofs, complete as they are, may be strengthened by the cicatrisation of the umbilicus, the sealing of the epidermis, the closure of the fœtal ducts, and the size of the osseous nucleus of the inferior epiphysis on the femur. The existence of milk, sugar, starch, and medicines in the stomach, determined by the appropriate chemical tests, and by the presence of fæcal matter other than meconium in the lower intestines of course show that the child has lived. (*The Boston Med. and Surg. Journal*, Sept. 4, 1879.)

Notes and Queries.

Allen and Hanburys' Perfected Cod-Liver Oil.—There are few, if any, medicines more troublesome to administer than cod-liver oil, and it is often grievous to find that patients whom it would almost certainly benefit will not take it. The various emulsions in which it has been combined enable one to get it taken sometimes when pure oil is refused, but it frequently happens that patients become disgusted after they have taken emulsions for a short time and refuse to go on, while pure oil can be continued for a much longer time. It is therefore a great boon to get such an oil as the present. We have tried it, and find that it is exceedingly bland to the taste and causes no eructations or nausea afterwards. We have seen very few specimens of oil so good as this, and it well deserves the name of "perfected."

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Department of Public Health.

ON THE SUPPOSED DETERIORATION OF HUMANISED VACCINE LYMPH IN THIS COUNTRY; *À PROPOS* OF THE QUESTION OF "ANIMAL VACCINATION."

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Dr. Cameron, M.P., has attributed (the *Times*, March 24, 1879) the late prevalence of small-pox in this country to some supposed deterioration of our arm-to-arm vaccine lymph. I deny that altogether, and would offer the following observations on the subject.

As I believe I have examined more vaccinated children than any man alive or who ever lived—having had my time chiefly devoted to such investigation for now nearly twenty years, first, in making, with my friend Dr. Seaton, inquiry into the condition of vaccination in the country, then as inspector, and now for some years having had the direction of the National Vaccination Establishment—I can speak with great confidence, and not a little experience, of the continued activity and efficiency of the lymph distributed by our arm-to-arm system.

I have had no time to prepare any statistics to enforce my argument, but I have jotted down from the Registrar-General's Annual Summary the mortality resulting from the late epidemic of small-pox in the metropolis. In the table attached (see Table) I have put down the deaths by small-pox in different groups of ages for each of the years during which the epidemic lasted. This table is remarkable, as it shows how very uniform are the variations in amount of mortality in each group of ages for each

of the years—a result indicating, I affirm, some modifying influence; and if that influence be not vaccination I should like to know what it is?

DEATHS BY SMALL-POX.

Registered in London in several groups of Ages during the Epidemic of 1876–1878.

Year.	All ages.	0—1.	1—5.	5—20.	20—40.	40—60.	60—80.	80 and —.
1876	735	88 11·9	125 17·0	175 23·8	269 36·5	69 9·3	9 1·2	0
1877	2544	256 10·0	440 17·2	716 28·1	862 33·8	233 9·1	36 1·4	1
1878	1416	174 12·2	23 1·6	429 30·2	444 31·3	111 7·7	24 1·6	0
Total	4695	518 11·0	588 12·4	1320 28·0	1575 33·5	413 8·7	69 1·4	1

500 estimated to be added for 1879.

1870 . . .	958
1871 . . .	7,876
1872 . . .	1,781
	10,615 total deaths in former epidemic.

In the first group of ages—that between 0 and 1 year—it is found that the mortality in each year has been nearly the same—about 11 per cent. of the total deaths at all ages. The mortality here is of course due chiefly to infection in utero or during nursing; and in all probability next to none of these children had been vaccinated at all. In the next group, 1—5 years, we come to the period during which, under our present system, we may aver that the children are most perfectly vaccinated. This in former times was the period of life that contributed so largely to small-pox mortality; by the total it appears that while the gross number of deaths compares very favourably with other groups, the mortality for the last year stood at less than 2 per cent. In the next column, 5—20 years, the most difficult one in the whole series, seeing that in

its midst we come upon the line of demarcation between compellable and non-compellable recipients of vaccination—children over fourteen years of age being exempt from the compulsory clauses of the Vaccination Acts—I regret that I have no means of dividing this group into 5—10 and 10—20 years, as in the latter half would be found all those non-compellable children, Irish immigrants and street arabs, that so largely contribute to small-pox mortality in every epidemic; but even in this column, unanalysable as it is, and dealing with such a largely unprotected part of the population, we do not find the greatest amount of mortality. All the other columns may be looked upon as beyond the influence of our present improved system of arm-to-arm vaccination, and in proportion to the numbers living in each group of ages the mortality may be said to be far in excess of that in the groups liable to the influence of the better vaccination; but in these last columns I would point out that the percentage diminishes from year to year, not unlikely owing to the increased influence of revaccination under the improved plan. However, I submit the table is favourable to my contention, as far as it goes, but its scope is very limited. I claim, then, that these figures, so far from indicating any deterioration of arm-to-arm lymph, afford clear evidence to the contrary.

Here it is worth mentioning that the deaths by small-pox in the late epidemic, now happily over, were not quite half as numerous as those unhappily following the epidemic of 1871—2 (4,695 as against 10,915). This I also claim as due in some measure to the protectiveness of our present system.

In the absence of such crucial tests of efficacy of vaccination as that which was practised in the old Jennerian period, to wit, the inoculation with variolous matter of those recently vaccinated, I may adduce the fact that the nurses of our small-pox hospitals had only our supposed deteriorated lymph to rely upon for the perfect protection from small-pox which they enjoyed during three years of exposure to infection in its most virulent form. Although the former Jennerian experiments are now illegal, I can hardly conceive a more crowning proof of the excellence of our present system of vaccination and the continued efficiency of humanised lymph than that afforded by immunity under such circumstances.

I would ask, Is not the agitation now in progress, as to "animal vaccination" so-called, an outcome of the anti-vaccination movement? Are we not asked to provide calf lymph because it is thought to be somewhat out of our reach, and so the would-be unvaccinated may remain unvaccinated? I know that in a recent case of vaccination default at Hackney a man was summoned more than once, and at last he stated at the Board of Guardians that he would not have his child submitted to such contamination as arm-to-arm vaccination; but that if he could have it done from the calf he would,—whereupon one of the Guardians gave him some money in order to get it so done. At this he was somewhat nonplussed, but at last he said he had altered his mind and would not have it done at all.

I do not wish to say a word against so-called animal vaccination; but I can positively state that, examining dozens of recently vaccinated children every day of my life, and that during a long series of years, I find no ground whatever for the suspicion that the present arm-to-arm lymph has lost its true and original Jannerian character.

I do not believe that our arm-to-arm method affords any less protection than it ever did. But, supposing it had lost force, what is the remedy proposed? Dr. Cameron proposes to overcome the difficulty by allowing parents to select their own mode of vaccination. In other words, scientific men are at fault and would go to the untutored people for a remedy. This appears to me to be very inconsistent. Do we as medical practitioners in a case of costiveness, for example, inquire of our patient, "Now, sir, shall it be jalap? or will you have castor oil?" This is surely to surrender the skill of the educated to the guesses of the ignorant.

And what is this all for? Why, to avoid the millionth of a chance of infection of syphilis by vaccination. I may here state that at the Local Government Board we have continual complaints of the untoward results of vaccination, and we also have constantly reports from the Registrar-General of deaths that have been recorded as having been caused by vaccination. Now it has been my duty to inquire into nearly all these allegations and untoward death records in person. Some of my colleagues have investigated a few, and I believe with the same results. Well, I

state most positively that I have never found in any one single instance any ground whatever for these allegations against vaccination, and I have not been able to substantiate the accuracy of any one of the death returns so aspersing it. The risk to be legislated against is so infinitesimally small that, without attempting to treat lightly this very important and serious subject, I would state that if the legislature would—in place of the Bill of Dr. Cameron's, and as a means of still further safeguarding the people against unnecessary mortality—enact some measure for providing safe conveyances for mother and child from their home to the vaccine station, for thus protecting them from opposition omnibuses, careless cab-drivers, and slippery streets, they would prevent a much larger amount of mortality and mischief than is caused by the vaccination of the infants from an average vaccinator at any free public station.

Without saying a word in disparagement of calf lymph, I would nevertheless observe, bearing in mind the very small risk that is incurred by arm-to-arm vaccination, that perhaps equally small—but still some—risk may attend the other method. In this connection I may relate what occurred during my inquiry into the state of vaccination in the counties of Cheshire and Lincolnshire. My visit occurred at the time of the invasion of rinderpest. To avoid, if possible, the ravages of this calamity, farmers were induced to try the vaccination of their stock as a prophylactic. This was done largely, and, of course, chiefly by public vaccinators, who, when they had succeeded in vaccinating the heifers, tried the lymph so produced on numerous children. In very many cases the local mischief and general disturbance of the system that ensued were great, and I know that two infants succumbed to the experiment.

No; animal vaccination is not the remedy, if we want improving. The legislature in its wisdom has determined that all shall be protected by vaccination against the filthiest of diseases; and to that end has made vaccination compulsory, and has caused provision to be made for the only system which has yet been devised, even in the opinion of the most ardent advocates of animal vaccination, that could meet the general requirements of this kingdom. If the administration of that system has failed in any part, if the best lymph has not been used which

could be got for the purpose the legislature had in view, by all means let us be shown where amendment can be made, and how a better lymph can be got which may be introduced into the public system without sacrificing any part of that sure advance which has now been secured, and which is being rapidly pushed forwards towards the general thorough vaccination of the population.

SANITARY LEGISLATION DURING THE PAST SESSION.

The sanitary legislation of 1879, although no comprehensive or large general measure was dealt with by Parliament in the Session of that year, is of considerable interest. Especially is this the case with so much of it as relates to the limitation of infectious diseases. We propose briefly to indicate the more important provisions of the several Acts touching public health matters which were passed during the Session.

The Artisans' and Labourers' Dwellings Act (1868) *Amendment Act,* 1879 (42 and 43 Vict. Ch. 64), is designed to amend the Act of 1868 in several respects in which that Act has proved defective in operation. Particularly it provides for arbitration in disputed questions of compensation for premises which the local authority may require for the purposes of the Act, for the disposal of land which may have been acquired by the local authority and afterwards found unnecessary for their wants; for empowering the Metropolitan Board of Works to enforce the Act in such cases in the Metropolis where the local authority has failed to do so; for authorising the local authority to make bye-laws regulating the dwellings belonging to them under the Act, and generally meeting defects of detail in the original Act.

The Artisans' and Labourers' Dwellings Improvement Act, 1879 (42 and 43 Vict. Ch. 63), makes better provision as to the assessment of compensation for premises acquired under the original Act, and makes also an important amendment of the 5th section of that Act. This latter section provides, amongst other things that an improvement scheme of a local authority for the purposes

of the Act shall provide for the accommodation of at least as many persons of the working classes as may be displaced in the area with respect to which the scheme is proposed in suitable dwellings which, unless there are special reasons to the contrary, shall be situate within the limits of the same area of the vicinity thereof. But as it has not unfrequently proved that equally convenient accommodation for the persons displaced and at a much less cost can be furnished to such persons or some of them at some place other than within the area or the immediate vicinity of the area from which they have been displaced, the present Act authorises the modification of a scheme, and the requirements of the principal Act with respect to providing accommodation for persons of the working classes, so as to include, if it be thought desirable, suitable places for the purpose of affording the requisite accommodation, not situated within the limits of the area dealt with or in its immediate vicinity.

An Act to Amend the Sale of Food and Drugs Act, 1875 (42 and 43 Vict. Ch. 30). Considerable difficulty has been experienced in the administration of the Act of 1875, in consequence of an objection having been allowed by magistrates that articles of food and drugs purchased for analysis had not been sold, as the Act required, "to the prejudice of the purchaser." The amending Act provides that in the sale of adulterated articles it shall be no defence to any prosecution under the provisions of the Act of 1875 to allege that the purchaser, having bought only for analysis, was not prejudiced by such sale. The amending Act also provides that any medical officer of health, inspector of nuisances, inspector of weights and measures, inspector of a market, or police constable, may, under the direction of the local authority appointing such officer, obtain at the place of delivery a sample of milk in the course of delivery for submission to analysis.

An Act to Amend the Public Health Act, 1875, *as to Interments* (42 and 43 Vict. Ch. 31). This Act, which consists only of three brief sections, is a curiosity of legal drafting. It provides that the provisions of the principal Act, the Act of 1875, as to a place for the reception of the dead before interment, and called in that Act a mortuary, shall extend to a place for the interment of the dead in the amending Act called a

cemetery; and that the purposes of the principal Act shall include the acquisition, construction, and maintenance of a cemetery. In other words, the amending Act provides that a local authority shall have the same powers for providing a cemetery that it has for providing a mortuary.

The Limitation of Infectious Diseases. The interest of the several Acts which we are about to enumerate, so far as it is proposed here to consider them, rests in the various provisions they contain with reference to limiting the spread of infectious diseases.

Poor Law Act, 1879 (42 and 43 Vict. Ch. 54). This Act contains two important sections relating to hospital provision for infectious diseases, the one relating to rural sanitary districts, the other to the Metropolis, which differ from each other as to the principles upon which they have been framed. The general principle which the Local Government Board appears to have had in view, in the provision by sanitary authorities of hospital accommodation for infectious diseases under the Public Health Act, has been to make such provision the sole accommodation for their several districts, for pauper as well as non-pauper patients, separating the provision from workhouse association, and making it, as it should be, solely a sanitary matter. To facilitate arrangements to this end in rural sanitary districts, Section 14 of the Act under consideration provides as follows:—

14. If it appear to the guardians of any union desirable that any hospital or building vested in them as guardians under the Acts relating to the relief of the poor should be vested in them as the rural sanitary authority of such union, for the reception of persons suffering from any dangerous infectious disorder, the guardians may, by resolution to be confirmed by an order of the Local Government Board, transfer such hospital or building accordingly; and from and after the date named in the order such hospital or building shall be deemed to be vested in the guardians as the rural sanitary authority of the union, for the use of the inhabitants of the union or part thereof named in the resolution and order.

If the same is to be for the use of the inhabitants of any part of the union comprised in an urban sanitary district, the order may determine the contribution to be made by the urban sanitary authority of such district towards the maintenance of the hospital or building.

Where an urban sanitary district comprises part of the union, and the said hospital or building is not to be for the use of the inhabitants of that part, the order may determine the value of the interest of that part of the union in such hospital or building, and the manner in which such value is to be paid to that part by the residue of the union for whose use the hospital or building is to be kept and the application of the sum so paid.

With reference to the Metropolis, it has been held expedient to follow a different principle. Here it is provided that the poor law accommodation for cases of infectious diseases may be made use of by the sanitary authorities within the metropolitan area for public health purposes. Experience has shown—particularly during the last small-pox epidemic—that persons who do not belong to the pauper class willingly avail themselves of the advantages afforded by the Metropolitan Asylums Board Hospitals; and, indeed, it is difficult for any one to associate the notion of pauperism and poor-law administration with these admirable buildings, placed within their own inclosures, than which more perfect hospital accommodation for infectious maladies could not well be conceived. Section 15 of the present Act reads as follows:—

The Metropolitan Asylums Board may from time to time, with the approval of the Local Government Board, contract with any local authority in the metropolis acting in the execution of the Nuisances Removal Act, 1855, and the Acts amending the same, for the reception and maintenance in any hospital belonging to or under the management of such board of any person suffering from any dangerous infectious disorder within the district of any such local authority, and any person received into an hospital by virtue of any such contract under this section shall be deemed to be maintained in such hospital by the local authority with whom the contract is made.

Any expenses incurred by a local authority for the maintenance of any person under this section shall be deemed to be due from such person to the local authority, and may be recovered by the local authority from him, or from his representatives, at any time within six months after his discharge from such hospital.

Section 16 of the same Act provides in addition that—

The Metropolitan Asylums Board may from time to time provide and maintain carriages suitable for the conveyance of persons suffering from any dangerous infectious disorder, and shall cause the same to be from time to time properly cleansed and disinfected, and may provide and maintain such buildings and horses, and employ such persons, and do such other things as are necessary or proper for the purposes of such conveyance.

All expenses incurred by the Metropolitan Asylums Board in the execution of this section to such extent as the Local Government Board may sanction shall be paid out of the Metropolitan Poor Fund.

Nine Local Improvements Acts at least (we are not certain that we have received the entire number) were passed during the Session which contained provisions as to infectious diseases. The municipal boroughs obtaining these Acts were Leicester, Rotherham, Norwich, Warrington, Derby, Blackburn, Blackpool,

Llandudno, and Edinburgh. In previous Sessions of Parliament Huddersfield, Bolton, Burton-on-Trent, Nottingham, Jarrow, and Greenock, had obtained Acts containing provisions relating to the same subject. The Act for Bolton was amended in respect to its provisions relating to infectious diseases during the last Session.

The provisions for supplementing the powers given to Sanitary Authorities in the Public Health Act, 1875, are not uniform in the several Acts referred to, but it will suffice for our present purpose if we quote the provisions in the Blackburn Act. These, and nearly similar provisions in the Derby Act, aim at dealing much more comprehensively with the subject than, so far as we know, has hitherto been attempted. The Blackburn provisions are as follows:—

42 & 43 Vict. Ch. cxvi. Section 86. The following provisions for prevention of infection from disease, in addition to those contained in the Public Health Acts, shall take effect:

(A.) The Corporation may from time to time provide temporary shelter or house accommodation for the member of a family in which infectious disease has appeared:

(B.) The Corporation may themselves provide or contract with any person or persons to provide female nurses for attendance upon persons suffering from infectious disease:

(C.) The Corporation from time to time may order public or private day schools or other places of public resort situate in neighbourhoods threatened with or affected by infectious disease to be temporarily closed or suspended:

(D.) The Corporation may order any shop, dairy, or other place for the sale or storage of provisions, clothing, or other articles liable to retain infection to be temporarily closed whenever from the appearance of infectious disease in such shop, dairy, or other place, or in rooms in connection therewith, such action appears to the Corporation to be necessary, and may take all such means as seem to them desirable for the preventing the entrance of the public into such place, or of the issue from it of food, clothing, or other articles:

(E.) In case of the existence of any infectious disease in any house, the Corporation may issue an order declaring such house, or any rooms therein, or part thereof, an infected place, and forthwith, until such order has been determined by another certifying it free from infection, the following regulations shall in respect of such house or part of a house be observed:

(1.) No person occupying or living in any such house or part of a house shall continue at any indoor occupation which necessitates the handling of any clothing, food, or article likely to retain infection which is intended for sale or for the use of persons belonging to another family.

(2.) No person not authorised by the Corporation or their medical officer of health shall, except in cases of necessity or emergency, enter any such house or part of a house : [Omitted from the Derby Act.]

(3.) No bedding, clothing, or other articles liable to retain infection shall be removed from such house or part of a house without previous disinfection or without proper precautions (to the satisfaction of the Corporation) for the purposes of being disinfected :

Provided always, that when the room or rooms occupied by the persons suffering from such disease can be effectually separated, and are so separated, from the other parts of the same house or building, the rooms so occupied only shall be deemed to be affected by such order and regulations.

The Corporation shall make compensation to any person who has sustained loss by reason of the exercise of any of the foregoing powers, but such compensation shall be in regard only of direct material and pecuniary loss, and not in respect of any consequential loss or damage ; and any person who shall offend against this enactment (unless ignorant thereof, the burden of the proof of which shall be on him) shall for every such offence be liable to a penalty not exceeding five pounds.

Section 87. In order to secure that due notice be given to the Corporation of any inmate of any building used for human habitation who is suffering from any infectious disease, the following provisions shall have effect (that is to say) :

(1.) If any such inmate be suffering from infectious disease, and no medical practitioner is attending on or has been called in to visit such inmate, the occupier or person having the management or control of such building, or if such occupier or person is prevented by reason of such disease, then the person in charge of such inmate, shall, so soon as he shall become aware of the existence in any such inmate of any such disease, forthwith give notice to the medical officer at his office, or to the inspector of nuisances at his office, of the existence in such inmate of such disease ;

(2.) If such inmate be not a member of the family of such occupier or person, the head of the family (resident in such building) to which such inmate belongs, or if there be no such head, then such inmate (unless prevented by reason of such disease or of youth), shall, on becoming aware of the existence in such inmate or in his own person, as the case may be, of such disease, forthwith give notice thereof to such occupier or person ;

(3.) The Corporation shall provide and supply gratuitously to every registered medical practitioner resident or practising in the borough forms for the certificate by such medical practitioner of the particulars hereinafter mentioned in relation to such cases, according to the form set forth in the Seventh Schedule to this Act ;

(4.) Every medical practitioner attending on or called in to visit such inmate shall, on becoming aware that such inmate is suffering from any infectious disease, forthwith fill up, sign, and send to the medical officer at his office, or to the inspector of nuisances at his office, a certificate [or declaration, Derby] stating, according to the forms prescribed and supplied to him by the Corporation, the name of such inmate, the situation of such building, and the name of such occupier or person, and the nature of the disease from which such inmate is suffering ;

(5.) The Corporation shall pay to every medical practitioner who shall in pursuance of this section duly make and give any such certificate [or declaration, Derby] a fee of two shillings and sixpence for every such certificate ; provided that more than one fee shall not become payable under this section within an interval of thirty days to the same medical practitioner for certificates given by him in respect of the same disease occurring in the same building [the words after "provided" and ending "building" omitted from the Derby Act] ;

And any person who shall offend against this enactment (unless ignorant thereof, the burden of the proof of which shall be on him) shall for every such offence be liable to a penalty not exceeding five pounds.

THE SEVENTH SCHEDULE.

CERTIFICATE OF DISEASE.

Blackburn Improvement Act, 1879.

To the Corporation of the borough of Blackburn.

Pursuant to the above-mentioned Act, I hereby certify and declare that in my opinion the under-mentioned person is suffering from a disease within the terms of the said Act.

Dated the day of 18.

(Signed)

Name of person suffering from the disease ...
Situation of the building wherein such persen is...
Name of occupier or other person having the charge, management, or control of the building or room ... ...
Nature of the disease ... ...

NOTE.—This certificate must (under penalty of five pounds in case of neglect) be forthwith sent to the medical officer at his office, or to the inspector of nuisances at his office, and delivered to the official, clerk, or servant who shall be found in attendance there.

The provisions in the other Acts referred to are restricted substantially to the objects contained in Section 87 of the Blackburn Act, but modified in several as to phraseology. In the Warrington Act (42 and 43 Vict. Ch. 92) alone, provisions are found as to existing hospital accommodation. This Act also gives further powers as to disinfection of premises and to the removal of patients to hospital. These provisions are as follows:—

24. Where the Corporation are of opinion, on the certificate of their medical officer of health, or of any other legally qualified medical practitioner, that the cleansing and disinfecting of any house or part thereof, and of any articles therein likely to retain infection, would tend to prevent or check infectious disease, and that such cleansing and disinfecting would more effectually be carried

out by the Corporation than by the owner or occupier of such house or part thereof, the Corporation may, without requiring such owner or occupier to carry out such cleansing and disinfection as aforesaid, themselves cleanse and disinfect such house or part thereof and articles, and may for that purpose remove any such articles, and may recover the expenses incurred by them in the execution of this section from such owner or occupier, or may, if they see fit, themselves defray such expenses, or any part thereof.

25. Whereas the Corporation have provided within the borough a suitable hospital for the reception, treatment, and isolation of persons suffering from dangerous infectious diseases, and it is expedient to make further provisions for removal thereto of persons so suffering: Be it enacted, that on the certificate of the medical officer of health of the borough, or other legally qualified medical practitioner, that any person within the borough is suffering from small-pox, cholera, scarlatina, diphtheria, typhus fever, enteric or typhoid fever, relapsing fever, puerperal fever, or any other dangerous infectious disease, and is without proper lodging or accommodation enabling the case to be properly isolated, so as to prevent spread of the disease, or to be properly treated, the Corporation may give notice to the head of the family (resident in the same building) to which the person so suffering belongs, requiring the removal forthwith of such person to such hospital as aforesaid: Provided that if there is no such head of the family, or if such head of the family is absent from the borough or cannot be found, such notice may be given to the person so suffering.

If the person to whom such notice is given consents, the Corporation may forthwith remove the person so suffering to such hospital as aforesaid; but if the person to whom such notice is given refuses to consent to such removal or to be removed, or is by reason of age, disease, or otherwise, incapable of giving such consent, any justice may, on the application of the Corporation, make an order for the removal of the person so suffering to such hospital as aforesaid. Such order may be addressed to an officer of the Corporation or to any constable of the borough, and any person who disobeys or obstructs the execution of such order shall be liable to a penalty not exceeding ten pounds, and to a further penalty not exceeding twenty shillings for every day during which such disobedience or obstruction continues.

Any expenses incurred by the Corporation in respect of the conveyance of such person to such hospital, and his maintenance and treatment therein, may be recovered by the Corporation from such person, or from his personal representatives in the event of his death therein; or the Corporation may, if they see fit, themselves defray such expenses or any part thereof.

The Blackpool Act (42 and 43 Vict. Ch. 199) contains a provision authorising the local authority to erect temporary hospitals with all necessary appurtenances and requirements for giving them efficiency.

THE CONSTRUCTION AND CLEANSING OF SCHOOL OFFICES.

[The following important Memorandum issued by the Education Department of the Privy Council Office for the information of School Managers on the means of Excrement Disposal of School Premises has been prepared by the Medical Department of the Local Government Board.]

It is presumed that school managers will be anxious, not only that the arrangements for these objects should be such as to make the school premises wholesome, but also to secure that such standards of cleanly and wholesome contrivance shall be set before the pupils as may conduce to the better understanding and fulfilment of common sanitary indications by the next generation of English men and women.

Of all means of excrement disposal, the best is a well-constructed water-closet, where this can be had. School premises that are within 100 feet of a public sewer ought always to have water-closets, and if they are somewhat further off than this, it is well worth while to incur some expense in laying drains for the sake of the advantage that the water-closet affords. The principles of construction concern the closet itself, and the drains leading from it to the sewer. The best form of closet for schools is MacFarlane's trough closet, which can be had of a size for small or large schools, is of almost indestructible materials, and the machinery of which needs to be put in action only once or twice a day, and not by the person using the closet. If other forms of closet be used, an efficient trap capable of retaining some water into which the excrement may fall, with water service to the closet in independence of any drinking water service, are the desiderata to be attained. As for the drains, whatever be the form of closet, ventilation of the soil pipe is the first essential; that pipe should be carried up, full bore, from a point below the trap to an appropriate place in

the external air outside the closet chamber. The second point is to make sure that the drain to the sewer is of glazed pipe properly jointed and laid with an equable fall. And the third point is to put near the junction of the school drain with the sewer a trap and air opening to sever the air of the common sewer from the air of the drain, and to provide for the requisite movement of air through the latter.

With a water-closet contrived in accordance with these principles very little supervision is required; but that supervision needs to be given day by day, particularly at first, and in the case where children are not used to water-closets.

Where, for any reason, some other form of closet has to be used, the first matter for consideration is whether some clayey or marly earth is to be had in the neighbourhood of the school. If so, the earth-closet will be the best arrangement.

Earth-closets are particularly eligible arrangements for country schools, where the school premises have some garden ground near them from which earth can be supplied, and to which the resulting valuable manure can be afterwards used. For this form of closet a shed, under which the earth can be placed to dry, and a well-built brick trough under the seats of the closet, are the essential requisites, as application of dry earth needs to be done after every use of the closet. It will be very desirable, further, that the closet should be provided with some simple hopper contrivance (such as those of Moule's Earth Closet Company) for delivering the earth over the excrement, but the same object may be obtained by an earth box and scoop on the closet floor, and some servant of the school be appointed to see that due use is made of these. Removal of the contents of the earth-closet pit will have to be frequent, in proportion to the use that is made of the closet; but, provided a sufficiency of dry earth be used and the contents of the pit be kept dry, there will be no offence from the closet even if the pit be not emptied for several weeks, or even months. But here, again, as in the case of any closet, attention to the day by day working is required to keep the closet tidy and wholesome.

Very much inferior to either the water-closet or earth-closet as a means of disposing safely of excrement, especially under the particular circumstances of schools, is the ash privy. In

this form of privy the intention is to keep excremental matters, by the use of abundance of coal-ashes, so far dry that they do not undergo much offensive decomposition during the short intervals that elapse between successive emptyings. But owing, in part at least, to the number of persons using a school closet being largely out of proportion to the production of ashes in the school, it is difficult efficiently to prevent offence from ash privies there, and the most frequent possible emptyings have to be secured. Large midden pits are sure under these circumstances to become offensive, especially during the season, summer and autumn, when there will be small production of ashes in the school-house. A good arrangement is to place a movable vessel under the seat of the closet and to let ashes be thrown into this as often as any quantity of ashes is produced through the hole in the seat. This vessel should be accessible, not from the closet itself, but from the outside wall, and it should be removed once or twice a week, and a clean one substituted. Of course the supervision needed for other forms of privy has to be even more exact and detailed than this.

The best arrangement for preventing excrement nuisances in those schools that cannot have water-closets or earth-closets, and where there are not sufficient ashes for deodorising, is to furnish the privies with movable receptacles as above, and to arrange for the daily removal of their contents, the daily replacement of the used vessel by a clean empty one, and the daily cleansing of the closet chamber, and it will usually be best to put the whole working of such arrangement into the same hands, appointing a person to do the whole duty of scavenging and cleaning the school privies. Particularly this arrangement commends itself for adoption in districts where heretofore the old garden privy, with no use of ashes, has been the rule. The plan of daily emptying will in part be paid for in such districts by the resulting manurial matters; but, in so far as it may prove to be somewhat expensive, its cost will have been usefully incurred if it set before the scholars an example of how the more objectionable forms of privy can in practice be got rid of. And it will be observed that this plan demands from the managers of the school the minimum of daily personal action, and requires from them indeed only such general supervision of the work of those who

undertake the removal as would be required under like circumstances in a private house. For further details reference may be made to the Report [of the Local Government Board] on means of Excrement Disposal, and to the Model Byelaws,[1] Series I. and IV., issued by that Board for the use of Sanitary Authorities.

[1] N.B.—Series I. relates to the removal of refuse and the cleansing of offices; Series IV. to the construction, ventilation, and drainage of buildings and offices.

THE PRACTITIONER.

FEBRUARY, 1880.

Original Communications.

ON CATARRHAL PNEUMONIA AND TUBERCLE IN THE HUMAN LUNG.

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(*Continued from page* 24.)

ON THE EFFECTS OF INCREASED BLOOD-PRESSURE SUDDENLY APPLIED TO THE BLOOD-VESSELS OF THE LUNG.

In studying the subject of acute bronchitis, we found that a mere sudden distension of the blood-vessels in the mucous membrane is sufficient to induce very serious changes in the bronchial epithelium. A turgescence of these, even for a few hours, causes desquamation of the superficial layers of epithelium and exudation of leucocytes into the mucous membrane. It is essential, before commencing the examination of the lung in catarrhal pneumonia, to consider what the effects of increased blood-tension are; otherwise the exact significance of catarrhal pneumonia in relation to other so-called inflammatory affections of the lung cannot be clearly demonstrated. In this preliminary

inquiry we shall endeavour to show, in the first place, what the effects of suddenly increased blood-pressure in the vessels of the lung are, and, in the second place, what effects follow when it is gradually applied, and extended over a long period of time.

We all know that one of the characteristic features of what we call a croupous inflammation of a part, that is to say, where a "false membrane" is thrown out on a free surface, and where the vessels of the part are in a state of turgescence, is the suddenness of the attack. Such croupous forms of inflammation are exemplified in croup, where the mucous membrane of the larynx becomes covered with what is known as a "false membrane"; in fibrinous pleurisy, where a similar "false membrane" can be stripped off from the pleura; and in lobar or acute pneumonia, where a solid exudation of the same kind is effused into the cavities of the air-vesicles. In all these, the diagnostic points of the disease are the turgescence of the blood-vessels of the part, and the pouring out of fibrinous lymph. There is no real difference between the three, further than that of locality. In all of them, when the false membrane is removed, the underlying surface is found to be unbroken and comparatively healthy. They accordingly sometimes go by the common designation of "croupous inflammations."

What is this so-called "croupous inflammation?" How is it induced? Is it allied to "catarrhal inflammation," and, if not, what are the essential differences between them?

We shall study these questions by reference to croupous pneumonia more especially, although the following observations apply equally to similar affections in other parts of the body. This lesion of the lung is very properly divided into three stages—congestion, red hepatization, and grey hepatization. In the stage of congestion the vessels are turgid with blood, but as yet there is no solid effusion into the air-vesicles, and the lung is still vesicular. When the air-vesicles are examined in this stage the whole of their capillary blood-vessels are found to be distended and engorged with blood. In some places the engorgement is greater than in others, probably from the circulation in certain of the branches, in the areas of greatest congestion, having been in a state of stagnation. The epithelium covering the air-vesicles may be observed to have desquamated in some

places, and to have been cast off into the alveolar cavities. The epithelial cells can be seen rising from the alveolar wall, and, here and there, separating from it.

In the second stage, or that of red hepatization, effusion of a solid substance has taken place into the air-vesicles, rendering the lung partially or completely non-vesicular, so that it now has the consistence of liver-tissue, and will sink in water. When this solid material is microscopically examined it is found to be composed of the following elements : fibrin, blood-corpuscles of both kinds, and desquamated epithelium. The fibrinous network closely adheres to the alveolar walls, and the other elements are entangled in its meshes. In many of the air-vesicles small hæmorrhages have evidently occurred, as lobules are occasionally noticed distended with blood. The lung in this stage is tough, and is not easily broken down. The blood-vessels at the same time are in a very turgid condition, from the large amount of blood which they contain.

In the stage of grey hepatization, the lung becomes completely solidified, has a greyish anæmic appearance, and has lost its tough consistence, being more friable than it was in that of red hepatization. This difference in consistence is due to changes which have ensued in the nature of the exudation. For, whereas, in the second stage, fibrin was its main constituent, this has now almost entirely disappeared by a process of degeneration, and a great accession to the number of leucocytes has taken place. These, in the grey stage, are almost the sole occupants of the air-vesicles, which they distend to compression, and signs of commencing fatty degeneration can be noticed in them. The turgidity of the blood-vessels has disappeared; and, although some of them may still contain blood, they have not the same engorged appearance that they had in the earlier stages.

In all other situations where croupous inflammations occur the disease goes through the same transitions, and the exudation or false membrane is made up of similar constituents, namely, fibrin, leucocytes, coloured blood-corpuscles, and desquamated endo- or epithelium.

From the study of the frog's web and the mesenteries of different animals we know what the effect of an irritant suddenly applied to these tissues is. The arterioles spasmodically

contract, and remain in a contracted state for a length of time proportional to the intensity and duration of the irritation. This is undoubtedly a reflex act, consisting in the propagation of a stimulus to a vaso-motor centre, and the giving out of increased nerve energy sufficient to keep up a more or less tonic spasm in the arterioles. We see the result of this spasmodic contraction of the arteries in the blanching of the skin which immediately follows the infliction of a burn or the application of intense cold. The death-like pallor of such parts is due to spasm of the muscular coat of the arterioles. Should the cause of irritation be soon removed, however, the spasm of the arteries ceases, the muscular coat apparently becomes wearied, and the action previously set up is now followed by an equivalent counter-action. This is characterized by the relaxation of the arterial coats, and by an increased rapidity of transmission of the blood-stream, and should no obstruction exist in the capillaries or veins, this simply produces a reddening of the part, which ceases in course of time, as the arteries regain their proper tone. No deleterious effects follow, as we can verify in the mere reddening of the hands after working in snow or other cold medium.

During the period of spasm, however, more especially if it has been kept-up for a lengthened period, the blood may have become so inspissated within the capillary vessels or veins that, when the arterial circulation returns, on the relaxation of the arterial coats, the blood-corpuscles, which have accumulated in the capillaries, will probably refuse to move onwards, and stasis, more or less complete, will follow in the circulation through the part. If this be spread over a large area, and if it is not ultimately overcome, the part dies. We see this in the effects produced by the prolonged action of cold on a part. The circulation is not re-established, the blood-corpuscles have become too firmly impacted within the capillaries, and death of the part ensues, producing what we know as a "frost-bite."

But if the obstruction of the capillaries is not universal, if it occur only here and there, then entirely different phenomena ensue, which we call "inflammatory." The part becomes painful, hot, dusky red, and swollen. When minutely examined it is found that its vessels are distended, and that there is more or less stasis at the focus of greatest irritation.

The blood-corpuscles, as shown by Addison, Zimmermann, and Cohnheim, now begin to leave the blood-vessels. The leucocytes, more especially, make their way through the walls of the veins, capillaries, and small arteries; but the coloured blood-corpuscles also escape in considerable numbers. These wander into the tissues immediately around the vessels, or, if the latter lie near a surface, as in a serous membrane, they exude on to it, and accumulate there. At the same time, it is evident that increased exudation of the *fluid* constituents of the blood has also been taking place, from the swelling seen in the part, and from the great amount of fluid contained in its lymphatic vessels and fibrous interspaces.

All these phenomena, to which we give the name of "inflammation," I look upon as *purely mechanical*, and as resulting from one cause, namely, *suddenly increased blood-pressure.* Before, however, showing what the facts and arguments are which have led to this conclusion, it will be advisable to compare the phenomena just recorded, which have been repeatedly observed in inflammation of the transparent parts of the lower animals, with what ensues in the lung of man under like circumstances, and to see whether they correspond.

The organ, from the fact of its communicating with the atmosphere, is constantly liable to irritation. Sudden changes of temperature, the inhalation of foreign bodies, and other such external agencies, tend to over-stimulate its exposed surface. We know that if a serous membrane, which it much resembles in structure, were exposed to the same vicissitudes, it would react in a most violent manner. Take then, as an example, one of the commonest sources of irritation of the alveolar walls, namely, the sudden application of cold. We are all liable to such exposure, and no doubt the alveolar blood-vessels are constantly reacting to it. It is only in certain cases, where the parts are probably unduly stimulated, or in which the blood-vessels are in a specially favourable condition for further change, that any morbid condition of importance is induced. The first effect of the application of such stimulation, judging by analogy from what has been verified in other parts, will be to cause spasm of the branches of the pulmonary and probably also of the

bronchial arteries.[1] This will last so long as the stimulation continues, and will be proportional in amount to its intensity. During this time the circulation within the capillaries connected with these constricted arteries will have stagnated, and the fluid part of their blood, probably by passing through their walls, will leave the corpuscles as the almost sole occupants of their lumina; or, as Mr. Jones has described, (Guy's Hospital Reports, vol. vii.) blood-corpuscles may regurgitate into them from neighbouring blood-channels. When the period of arterial spasm is over, and when relaxation of the muscular coat of the small arteries takes place, the blood will rush through them with greater freedom, but will meet with serious obstruction to its onflow in those capillaries in which stasis has occurred. The condition of many of these capillaries, we know, will entirely preclude the passage of blood-corpuscles along them, and the seriousness of the ill-effects which will result depends upon their number and on the extent of the area in which these now occluded vessels are distributed.

The main effect of this stagnation will be, that an increased strain will be thrown upon the vessels, or parts of vessels, which are still pervious, and *the tension of the blood within them will consequently be raised.* In the case of the lungs, the peculiar conditions of the circulation are specially liable to produce serious results under such circumstances, from the fact that the whole of the blood in the body must pass through them. This will certainly aggravate the effects produced by the congested stage, and may be one of the reasons why acute croupous pneumonia is so commonly met with.

The tension of the blood within the pulmonary vessels will then be suddenly raised, and the question as to what will follow, practically speaking, reduces itself to this:—What is the effect of suddenly increased pressure upon the transudation through an animal membrane when there is a fluid like blood on the compressed side of it? So long as the blood-channels are perfectly free, and so long as the venous outlets are larger than the arterial inlets, the force exerted in overcoming the inertia of the

[1] In some unpublished experiments we have found that on the application of a current of very cold air to the lung of a frog placed under the microscope the capillaries contract to two-thirds of their former diameter.—Ed. Pract.

blood-column, the friction of the vascular walls, and gravity, will result in the blood rushing onwards; but if the channels through which the blood circulates are occluded at certain points, and if the same force be still applied, it is clear either that one of the three following effects will be produced, or, what is more common, that all three will be combined. It must either

(*a*) raise the tension of the blood within the vessels; or

(*b*) it must cause an increased transudation of fluid through their walls; or

(*c*) it must stretch their walls and render their porosity greater.

We know, from numerous experiments, that, if a mixture containing salts and solids of an organic nature, as, for instance, water, chloride of sodium, and albumen, be placed on one side of an animal membrane, and slight pressure be applied to it, the constituent which passes through most abundantly is the water, and that, as the pressure increases, the albumen passes through in large quantity, while the amount of salt remains almost constant under different degrees of pressure. It thus follows that if the tension of the blood be, as in the natural condition, just slightly in excess of that required to overcome friction and other hindrances, a certain amount of fluids and solids (albuminoids) will transude. If this pressure be raised, however, an increase in the solids of the transudation will follow; and, if it be *suddenly* raised, before the parts have had time to accommodate themselves to the new conditions, the same amount of additional pressure will have a more marked effect than if gradually applied, in causing the transudation of a fluid loaded with solids.[1]

One of the first effects, therefore, of the sudden increase of tension in the pulmonary vessels will be that a fluid rich in solids (albuminoids, &c.) will pass out from the blood-vessels. It will undermine the epithelium, and, as Buhl has shown, will cause desquamation of it. It will next, seeing that the walls of the air-vesicles are extremely thin and delicate, be effused into the alveolar cavities, and will there produce fibrin in amount proportional to the solids, or rather the fibrin-forming

[1] Compare with this last statement the experiments of Runeberg (*Archiv. d. Heilkunde*, xviii.).

albuminoids which transude with it. It is important to remember that the greater part of the solid exudation of the red-hepatized stage of a croupous pneumonia is, in the first instance, poured out as a fluid. It is only when it has been effused that the fibrin, which afterwards in great part gives it its solidity, is formed. The determining cause of the fibrin-formation is, in all probability, to be sought in the dead epithelium which has been shed from the alveolar walls. The occurrence of croupous pneumonia at the base, in preference to the apex, of the lung, is, possibly, in considerable part due to the mere gravitation of the exudation, when first poured out in a fluid condition.

The presence of the fibrin in the exudation filling the air-vesicles is thus easily accounted for, if we look at the disease from a mechanical point of view; and wherever the same factors are brought into play in any part of the body, a similar fibrin-forming fluid exudes from the blood-vessels. I can see nothing more in its presence than the evidence of suddenly increased blood-tension.

We have assumed, although of course it is impossible to prove, that the real cause of the rise in blood-pressure in croupous pneumonia is that, in certain of the vessels within the lung, the blood is in a state of stagnation, so that they are, virtually, obliterated. Let us take another case, however, in which we are certain that they must have been occluded, and in which stagnation must have occurred, and see whether similar fibrinous exudation results. I have had many opportunities of studying what the effect of multiple small embolisms is upon the condition of the lung, where they are impacted in terminal branches of the pulmonary artery. It frequently happens that otherwise healthy subjects, who receive a simple fracture of a medullated bone, die from the effects of "fat-embolism." The oil from the medullary cavity is absorbed and carried to the right side of the heart, and thence into the pulmonary artery; its globules cannot pass the terminal branches of the artery, and become impacted in them. The embola are minute and are present in great numbers, while they are also bland and unirritating. The state of occlusion caused by them will, therefore, be exactly that which, *à priori*, I would say should give rise to a croupous pneumonia, on the principles just discussed, namely,

that certain of the blood-channels are obliterated, and that the blood forced into those which are still open is consequently at a higher pressure than under natural circumstances.

As an actual fact, croupous pneumonia, either of a general or of a localized character, is frequently associated with this embolic condition. I have in my possession several preparations of this kind taken from persons who, previous to the time of injury. were in perfect health, but who died in from forty-eight to sixty hours, with intense pneumonic effusion into one or both lungs, accompanied by widespread "fat embolism." In all respects, these lungs, with the exception of the presence of the embola in the vessels, presented the appearances of a red hepatization, and I think the conclusion inevitable, that the obliteration of the vessels was primary, the croupous exudation secondary.

It must not be supposed, however, that the *cause of the rise in blood-pressure* is always to be sought in an occlusion of certain branches of a vessel. It can easily be seen that different conditions of the blood itself would give rise to the same result, and, where these croupous inflammations are general, it is possible that this may account for them. In all cases, however, I can see nothing more in the exudation of a solid material than the action of increased, and, more especially, suddenly increased, pressure upon a fluid holding these solids in solution, and confined within an animal membrane of great delicacy.

The extra pressure existing in the lung capillaries will of itself force a thick fluid to transude into the air-vesicles, and will thus supply an excess of fibrin-forming materials. In the mechanism of respiration, however, we have another factor which may materially aid in causing inspissation of fluids effused into the lung, and which may account for the intensely solid character of the exudation in croupous pneumonia. Granted that, from suddenly increased blood-pressure, a fluid rich in solids is effused into the air-vesicles, there is a means by which this fluid may become still thicker. During inspiration the air within the air-vesicles must be at a lower pressure than that of the atmosphere, in order to effect the entrance of the latter into the chest. During expiration, however, it must be at a higher pressure than that of the atmosphere, otherwise it would not

leave the chest. Its tension requires to be raised before it will rush out, and to be diminished before it will pass in at the glottis. The whole virtue of inspiration and expiration consists in the tendency of a gas to assume an equal density throughout, the sphere of greater density causing a current into that of lesser density, until the two are in equilibrium. Under ordinary circumstances this interchange from a greater to a less dense medium goes on with perfect regularity in the chest, and, in all probability, any effects which might be caused by it are counterbalanced by the greater pressure being on either side, the atmosphere or the air-vesicles, alternately. But during forced expiration with an obstructed outlet the pressure within the air-vesicles may be increased to an extent enormously greater than that of the normal state. In coughing the chest is distended with air, the glottis is closed, and the inspired air is compressed by the muscles of expiration. Its tension will now be enormously raised, and the effect of this will be, under ordinary circumstances, to cause emphysema, on the principles before explained, when treating of emphysema as a complication of bronchitis (*Practitioner*, 1879).

If, however, a fluid containing a high percentage of solids is already present in the air-vesicles, as we have seen is the case in the commencement of a croupous pneumonia, then it is clear that a certain amount of the watery part at least of this fluid will be pressed out of the lung into its absorbents, and will leave the exudation in a still more concentrated state than it was when effused. The same principle will hold good for effusions into the pleura, where there have been coexistent forced expiratory efforts, as in coughing. If fluid has already been effused into the pleural sac, it will become inspissated by such forced expiratory efforts.[1]

It is therefore clear that several causes combined will tend

[1] Dr. James drew attention to this in a most able paper on the subject of exudations and transudations, read in November 1879, before the Edinburgh Medico-Chirurgical Society. (*Med. Times and Gazette*, Jan. 3, 1880.)

Dr. James, further, pointed out the fact, that the negative or diminished atmospheric pressure during inspiration will also, in the case of the pleura, aid in producing a fluid rich in solids, from the tendency to separation which will ensue between the two layers of the pleura, and the consequent aspiration produced thereby.

to render transudations into the air-vesicles, from suddenly increased blood-pressure, specially rich in solids—that is to say, in fibrin-forming constituents. It can now be easily perceived how it is that, after a few hours' illness, the whole of a lobe, or of an entire lung, may be rendered solid and non-vesicular, from the presence of fibrin and other blood-products. The exudation is loaded with solids when effused, and tends to become more and more solidified, from the positive pressure of forced expiratory efforts.

We have taken into account only one of the solid elements in the pneumonic exudation, and it may now be fairly asked, "How is the presence of blood-corpuscles to be accounted for on the mechanical principles just described? Does their presence within the air-vesicles not indicate that there is something more than mere mechanical action at work? Do they not show that the tissue has some special attraction for them?" I think it will be admitted by every one that the great mass of the cells found in the croupous exudation of acute pneumonia is composed simply of leucocytes. In the earlier stages of the disease the coloured corpuscles are quite as numerous as the colourless in the exudation, but the former very soon disappear, along with the fibrin, and are supplanted by a great increase in the number of leucocytes. In the stage of grey hepatization the number of these is enormous. They are usually accounted for on Cohnheim's theory of suppuration. The leucocytes, by virtue of their amœboid movements, are enabled to make their way through openings which naturally exist in the walls of the vessels.

Although there can be no doubt of the fact that they do exude, and that they form a large proportion of the pus found in the organ when resolution occurs, yet I feel convinced that the theory of their exuding, on account of their amœboid movements, has been carried too far, and that a great deal of misapprehension exists as to the principles upon which the passage of blood-corpuscles through the vascular walls is effected. Pathologists have run mad over this "exudation-of-leucocytes" theory, and I believe have totally mistaken its true nature. It has been supposed to afford an explanation of almost every known pathological process, from the formation of fibrous

tissue up to the growth and renewal of epithelium. There has been a mixing up of two processes which are occasionally associated, namely, true histogenesis, and the wandering outwards of leucocytes; and I believe that Cohnheim and his school, although deserving of praise for bringing into more prominent light the discovery of Addison, have done quite as much harm in ignoring, in a somewhat dogmatic manner, the part played by the tissues in the processes of regeneration and repair.

It has been already stated that in the stage of red hepatization leucocytes are present in considerable numbers in the exudation within the air-cells, while, in the stage of grey hepatization, they become much more numerous, and, in fact, form the main part of the solid deposit. Their presence in the air-vesicles, under such circumstances, is quite in accordance with what we find in other "acutely inflamed" parts. All croupous "false membranes" contain leucocytes in abundance, and there can be no doubt that they somehow pass out of the vessels and accumulate on the surface of the part. It is said that the cause of their exuding is that they possess amœboid movements, by which they are enabled to insinuate themselves into the natural openings or stigmata between the endothelial cells, and gradually to push their entire body outwards. What the exact reason is for this somewhat extraordinary behaviour of the leucocytes has never been clearly explained, but it is generally assumed that the "inflamed tissue" has some special attraction for them, which induces them to leave their natural habitat. This is entirely a matter of theory to which experiment has not given the slightest support.

It certainly is a very strange phenomenon that the colourless corpuscles escape into the tissues, and the explanation offered seems insufficient to account for it. What, for instance, is to be made out of the equally well established fact that the *coloured* corpuscles, which possess no such vital movements, also exude in the same way, although in lesser numbers. This seems to be a strong argument against the vital movement theory.

The cause of the phenomenon has, as yet, therefore, never been satisfactorily explained, although it is an undoubted fact that both in the living and in the dead subject there is evidence to

show that it takes place to a large extent in so-called "acutely inflamed" parts.

Before recording what experimental facts I have worked out in reference to the cause of this diapedesis of leucocytes through the walls of the blood-vessels, allow me to call the reader's attention to the following points, which are of primary significance in understanding it:—

(a) *The blood-vessels of the part in which the exudation of leucocytes occurs are in a state of acute distension.*

(b) *The circulation in many of them is in a condition of stagnation, and it is within those in which stagnation is greatest that the exudation of leucocytes is most abundantly observed.*

(c) *The exudation of leucocytes is accompanied by swelling of the part, from infiltration of fluid into its fibrous interspaces. This fluid is accounted for by increased transudation from the blood-vessels, indicating an increased blood-pressure. Ligature of the vein leading from the limb of an animal produces the same effects.*

(d) *It is where the return of blood is suddenly arrested that these exudative phenomena are observed.*

In the natural endothelial lining of blood-vessels, more especially of veins and capillaries, there are undoubted openings or deficiencies, through which blood-corpuscles might pass if the necessary forces were brought into play. These forces must be situated either in the corpuscles themselves, or must be extraneous to them. If they are extraneous, then it is clear that in the normal condition of the circulation they do not come into play, or are diverted, so that the corpuscles are driven in the direction of the blood-stream, instead of through the walls of the blood-vessels. If they are contained within the corpuscles themselves, then it is just as evident that they are not exerted, or that they are so counteracted, in the natural circulation of the blood, that few, if any, of the corpuscles manage to escape from the lumen of the vessel.

Putting aside the consideration of any forces that might be supposed to exist within the blood-corpuscles themselves, let us examine the effect of extraneous forces alone in causing their diapedesis. The following experiments, of a purely mechanical nature, seem to have a very important bearing on this subject: I made a solution of gelatine, glycerine, and water, of such

consistence that when cold it formed a soft jelly. This was cut into pieces about the size of a small pea, and these were placed, floating in water, upon one side of a dialyzer. The dialyzer was then connected with a column of water about three feet high, and, with its contents, was immersed in an outer vessel of water. There was now contained within the dialyzer a mixture of gelatine masses and water which we may, for the sake of illustration, suppose to represent the blood with its corpuscles. This was subjected to the pressure of a column of water three feet high, the dialyzing membrane being sufficiently strong to prevent rupture. We may further suppose the whole apparatus to represent a blood-vessel in which the circulation has been suddenly arrested at some part of its course, and in which the blood has come to a standstill. The blood-pressure formerly exerted in propelling the blood through the vessel would thus be diverted against its walls, and, as we saw before, would cause the transudation of more fluid, and of a fluid containing more solids, than when the circulation was free. It would also have the effect of stretching the walls of the vessel, and, of course, if this occurred suddenly, it would tend to enlarge all the natural endothelial openings, and also to separate the one endothelial cell from the other. What effect will be produced upon the blood-corpuscles?

To the arrangement we have above described let us now make some addition. Let the dialyzing membrane be perforated with a needle, so as to imitate the stigmata and other endothelial openings which exist in the distended blood-vessels. These small openings are out of all proportional size to the large masses of gelatine contained within the dialyzer. They are mere needle-point apertures, while the masses of gelatine, as before mentioned, are about the size of a small pea.

The moment an aperture is made a little capillary jet of water is ejected, but this is almost immediately closed by a mass of gelatine. Many such openings may be made and the same thing occurs in all of them; a mass of gelatine becomes applied to the perforation and stops the stream of water which is issuing from it. In the course of half a minute or longer, according to circumstances, an attenuated process of the gelatine mass is found to have made its way through the membrane, and projects

on the outer side of it in a little bead-like process. This increases in size, and, finally, the whole mass makes its way through, and is set free into the outer vessel of water in which the dialyzer is suspended. The passage of a mass of gelatine from the one side of a dialyzing membrane to the other, through an aperture probably not one-fiftieth part of its own diameter, can thus be accomplished, merely on account of the tension of the fluid within the dialyzer being greater than that outside.

A very strong argument in favour of a purely mechanical and extraneous cause being the agent of expulsion of the blood-corpuscles from the vessels in acute inflammation, seems to be established by this fact, for not only is a solid substance such as gelatine capable of being transmitted through a membrane in this way, but the whole of its transformations in shape are so like those of a blood-corpuscle, in being extruded from a vessel, as to render the comparison all the more striking.

Let us now alter the conditions of the experiment in some particulars. Instead of a dialyzer, let us employ a glass tube with a number of minute perforations in it, and let the pieces of gelatine be again suspended in water within it. Let both ends of the tube be open, and let the same pressure as before be applied to one of them. The fluid then circulates freely through the tube and issues in jets from the holes in it, as well as in a free stream from the open end. Let us now watch the pieces of gelatine circulating in the tube and see how they behave in their passage along it. Some of them, which are at the periphery of the tube, adhere to and are projected through its openings, but by far the greater number remain in the centre, and move along at an equable pace in a continuous stream. The amount of diapedesis which takes place in this experiment is infinitely less than where the stream is arrested.

From these observations we learn two things:—First, why the leucocytes exude in greater numbers than the coloured blood corpuscles; and second, why it is that, in the natural circulation in a part, only a small number of blood-corpuscles make their way out of the blood-vessels. It is a fact, which can be verified in the study of the frog's web, that while the hæmatocytes move in a rapid stream in the centre of the vessel, the leucocytes adhere to the walls and go at a much slower pace.

The latter are probably more viscid than the former, and hence they tend to adhere to the wall of the blood-vessel. We can easily understand, therefore, why it is that they should be exuded in such large numbers. As they roll along, in close contact with the endothelial lining of the vessel, they will naturally be applied over the openings which exist in it, and will more readily than the corpuscles in the centre of the stream be pushed outwards by the pressure of the blood from behind. When stagnation occurs at a point in front, of course the *vis e tergo* will be wholly diverted against the wall of the vessel, and will vastly increase the tendency to diapedesis. In the natural circulation of a part, where there is no obstruction in front, the *vis e tergo* is, in great part, expended in driving the blood along the natural channels, and the corpuscles, being carried forwards in the current, have little tendency to exude. It is only in the case of certain of the leucocytes, which, in moving along more lazily, in close contact with the endothelium, become applied to a stigma in the wall of the vessel, that any tendency to exudation occurs. The cause of the corpuscles not exuding in any great number, where the natural channels are quite pervious, is very much the same as that which enables a locomotive to run on a straight line instead of diverging into other paths. The *vis e tergo* is exerted in the direction of least resistance. Place some obstacle in that path, and then, as in the case of the blood-corpuscles, the onward progress of the locomotive is turned aside, and it is thrown off the line. Exactly in the same manner, the blood-corpuscles, so long as there is a free path in front, will run along this rather than out at the narrow stigmatous apertures. Obstruct that path, however, in front, either completely or partially, and let the *vis e tergo* be the same, and then, instead of passing onwards, the only course left for them to pursue is through the walls. If, as has been proved, there exist here natural openings, and if these openings be stretched, then the blood-pressure will drive the blood-corpuscles and the other blood-constituents through these, just as in a dialyzing membrane. If, further, the vital movements of the leucocytes come into play, they may aid in their extrusion, but that these are the primary cause of their expulsion I cannot believe, seeing that diapedesis occurs mostly under circumstances

where undue pressure is exerted upon the vascular walls, and also seeing that a similar phenomenon can be produced with bodies composed of dead material such as gelatine.

It is therefore clear that, quite independently of any vital properties, the whole constituents of the blood, solid and fluid, can, under circumstances of undue pressure, pass through the walls of the blood-vessels into neighbouring parts. The entire process, I feel persuaded, from what can be seen histologically in such parts, and from experimental evidence, is purely mechanical.

Another strong argument in favour of this croupous pneumonia and other forms of croupous inflammation being merely manifestations of undue blood-pressure suddenly applied, is seen in what can be effected in the way of treatment of such cases. Notwithstanding all that has been said to the contrary, and in spite of the prevailing *fashion* of the present day, I believe that venesection is the one sovereign remedy in this disease. To any one who has seen, as I myself repeatedly have, the instantaneous relief afforded by the abstraction of blood in this disease, even in cases where the constitution of the patient would be considered unsuited for the operation, the conviction is irresistible, that physicians have let a practice of the utmost value fall into disuse. It is not the object of the present series of papers to enter into the therapeutics of the subject, but, in passing, I cannot refrain from expressing my strong conviction that in venesection we have the one means of lowering the blood-pressure and cutting short the disease. Once the undue blood-pressure has been relieved, the exudation of its solid constituents must cease, and time will thus be afforded for the circulation in the part to recover itself. The hard wiry pulse of a person suffering from croupous pneumonia simply expresses the high tension of the blood. Remove part of the latter, and relieve this tension, and you will cut short the disease. The great mistake which has been made, in the practice of venesection, is that of employing it in the wrong kind of pneumonia—that is to say, in instances of catarrhal pneumonia. The main object we have had in view in this digression into the subject of croupous pneumonia, is to show the essential difference between these two diseases, which both, quite wrongly, go by the name of

"pneumonia." It will be shown in the sequel, that while acute or croupous pneumonia is simply a manifestation of suddenly increased mechanical pressure upon the blood-stream, catarrhal pneumonia is of a different nature, and that the indications for the treatment of the one are opposed to those of the other.

It is premature, at present, before we have shown what catarrhal pneumonia is, to make any deductions as to its essential nature, but having gone into the subject of the essential nature of croupous pneumonia, we are now prepared to ask the following question, the correct answering of which is of the utmost utilitarian value:—"Is what we call a croupous pneumonia to be reckoned as an inflammation?" This of course will depend upon what we mean by the term, but if it be applied to the exudation into a tissue, of a substance composed of the normal constituents of the blood, can we, with any logical reasoning, call this by the same name as a lesion in which the essential of the morbid process is the undue stimulation and proliferation of the natural elements of the tissue? We shall see that catarrhal pneumonia belongs to the latter class of diseases, and, to me, it seems the height of absurdity to call this condition by the same name as that in which there is mere effusion of the blood-constituents. There could be nothing more misleading; and until physicians come to recognize the *essential* difference between the two processes, their treatment will be a matter of mere empiricism, guided by the prevailing fashion of the day.

(*To be continued.*)

ARSENIC IN UTERINE HÆMORRHAGE.

BY GEO. S. A. RANKING, M.D. CHESTER.

I HAVE noticed an extract in the *Practitioner* for October from the *Virginia Med. Monthly Mag.*, 1879. It occurs at page 249, and is entitled *Arsenic in Uterine Hæmorrhage.* An experience of over four years in India, has shown me the great benefit which accrues from the use of arsenic in menorrhagia. As you no doubt know, menorrhagia is extremely common in women in India, and has seemed to me to bear some direct relation to ague. I am inclined to think however that ague is not a cause of menorrhagia, but that the administration of quinine in doses sufficiently large to check the ague is a certain cause of menorrhagia, if given within a week or ten days of the period. This opinion was forced upon me by my seeing that in cases where there had not been ague but where quinine had been given merely as a tonic, menorrhagia was of very common occurrence.

In the cases however where there was ague and menorrhagia combined I gave arsenic for the ague and found that the menorrhagia was improved. Thinking the arsenic might have had a beneficial effect I then tried it in cases of uncomplicated menorrhagia with success.

The doses I gave were usually 10 drops of Fowler's solution twice a day either alone or in combination with a mineral acid, after food.

Whilst on this point I may mention that my experience has so strongly convinced me of the ecbolic properties of quinine, that I never fail to ask as to the presence of pregnancy before ordering a dose of quinine. If pregnancy stands in the way of

quinine, I have never found arsenic, which I have of late combined with hydrobromic acid, fail to remove the aguish attack. The fact of the efficacy of quinine in ague taken in conjunction with its action on the uterus led me to try ergot in cases of ague and I found it extremely efficacious in checking the paroxysm.

PROGRESSIVE PERNICIOUS ANÆMIA.

BY L. HERBERT JONES, M.R.C.S.

I HAVE written the notes of the following case as a contribution to the further elucidation of this interesting and obscure disease, for it is by the record of facts and through pathological study, with the help of its handmaid, clinical medicine, that the *origo mali* may be at last successfully attained.

Sometime ago, M. S., æt. 34, sent for me to see her; she had been confined away from home about three months previously. She had a very good time, and child living and healthy. Previous to her confinement she states she was perfectly well, and never knew a day's illness. There was no history of consumption in her family, nor was there of syphilis. What struck me most on first inspection was the peculiar lemony hue of her complexion, with a patch over left brow of yellow pigmentation about the size of the palm of the hand. She was at the time suffering from a persistent hacking cough, especially in the morning; occasionally the sputum was streaked with blood. The menses had not reappeared since her confinement. On examining the chest I found harsh respiration at both apices—no dulness on percussion, but a very peculiar musical sound was heard over the whole of the anterior and posterior surfaces of the chest. I can only compare it to the sound of an Æolian lyre, the timbre varied. It was loudest when the patient took a deep inspiration, and gradually died away during expiration. This sound was heard distinctly over the jugular vein. I consequently concluded it was hæmic. There was a loud systolic bruit at the base of the heart. The glands in the neck and axilla were very much enlarged, the splenic dulness was increased, the liver

dulness normal. The tongue was inordinately pale, and the conjunctivæ pearly. The urine contained neither albumin nor bile pigment, s. g. 1020. There was no œdema of the legs. I ordered her steel in 10 ℳ doses, with quassia three times a day. Her appetite was fairly good, and she enjoyed a pint of beer daily. She remained in much the same state for about three months, when she complained of great giddiness and vomiting. There was no sarcinæ in the vomited matter, it was frothy, and occasionally green, and the stools became very offensive. Thinking the glands were at fault, I was induced to try iodide of potash in combination with strychnia, and under this treatment she apparently improved for a time. This in a short time failed, and epistaxis supervened to an alarming extent; there were no purpuric spots. Learning that she was a native of Lincolnshire, I ordered quinine and iron, on the presumption that marsh poison might be lurking in her system. I staunched the epistaxis with a fine spray of perchloride of iron. The vomiting was most obstinate, and the cough, with tenacious mucous expectoration, continued with great severity. By pricking the finger I drew two or three drops of blood, which I examined under a high power, and discovered that the white corpuscles were as one to ten. I reverted to my old treatment of iodide of potash and strychnia, and the patient partly rallied while taking this. The pigmentation on the forehead remained about the same size. There was no jaundice: the glands in the neck were certainly larger. From time to time I examined the blood, and found the white corpuscles varied—the proportion being sometimes smaller, sometimes larger; occasionally I discovered in the field corpuscles deeply red, smaller than the ordinary red ones, and spherical. The temperature was taken pretty regularly, and varied a good deal; the highest that was reached was $104\frac{4}{5}°$; it was always highest at night. Latterly diarrhœa set in, which was with difficulty controlled. Respiration became more frequent and laboured, twenty to thirty in the minute. The pulse became unusually high, often reaching 100; delirium at last came on; and most painful dyspnœa, lasting twenty-four hours, closed the scene.

Through the kindness of the husband I was able to make a post-mortem examination twenty-four hours after death, and the

result was the following:—The body presented a lemony hue all over, and appeared as if cast in a mould of wax. On removing the calvarium, which was remarkably thin, the brain appeared extremely anæmic. On dissecting out a few veins of the meninges and placing them under the microscope, there were seen small collections of white oil-cells. After the addition of dilute acetic acid the cell-membrane became more discernible, and then, by taking another section and adding ether, the nucleus became dissolved. The ventricles did not contain more than the ordinary amount of secretion; the sinuses were almost empty. The weight of the brain was 2 lbs. 6 ozs. The concatenate glands were large and firm, and partly cretaceous.

There were partial adhesions of the pleuræ. The lungs were very anæmic, but no trace of tubercle nor cavity was found in either. On removing the right lung some very large lymphatic glands were found in the posterior mediastinum, pressing on the right vagus, interfering with the thoracic duct and splanchnic nerves. The right lung weighed 1 lb. 8 oz.

On cutting into the pulmonary vessels no blood escaped, but adhering to the walls were the oily molecules before mentioned.

I now, as well as circumstances permitted, examined a portion of the great splanchnic by dissecting it out with needles. I found portions very softened; the white and grey portions seemed fused into a pultaceous mass of oily consistence; under the microscope there appeared granular molecules throughout. As time would not permit, I could not make as thorough an examination as I should have liked.

The kidneys were large and pale, the capsule was adherent, and fat was found between the capsule and the kidney. The weight of each was 6½ oz.

The supra-renal capsules were large; the cortical and medullary portions could with difficulty be discriminated. Under the microscope were cells not containing pigment, but round globules containing oil. In the medullary portion there were distinct cells varying in appearance, some round, others branched, also containing oil. A large portion of the capsules appeared like so much putty.

The heart was large, weighing nearly a pound; a good deal of

fat was found upon it. The cavities were healthy, markedly pale, and containing a quantity of viscous green fluid.

The liver was larger than normal, and weighed 3 lbs; the portal vein contained little blood, in which were globules, which responded to the tests given above. No reaction with iodine.

The spleen was large, soft, and friable, weight 12 oz. In examining a portion, cells were seen having a distinct membrane, and, by responding to the ordinary tests, proved to have no nucleus. The blood-globules were smaller, and had different shapes, some branched.

I was not allowed to examine the bones.

In commenting on this case we have not to deal with a question of names, but to endeavour to find out what underlying cause there is to account for these results. I must confess to a great amount of diffidence in tracing a cause for the train of symptoms in the case above described.

In attempting to trace them to their hidden cause it may be well to work backwards step by step, and see what each symptom indicates. In this case we have at first great pallor with hacking cough and expectoration slightly tinged with blood, harsh breathing at the apices, a systolic bruit at the base of the heart, and a loud musical sound over the whole anterior and posterior surfaces of the chest, as well as over the jugular veins. These symptoms were succeeded by giddiness and vomiting of frothy or green matters with very offensive stools. Next came violent epistaxis and a febrile condition with varying temperature. Lastly came diarrhœa with quick pulse and rapid respiration, ending in the distressing dyspnœa which closed the scene.

The pulmonary symptoms observed at first might have indicated commencing phthisis; but post-mortem examination showed the lungs to be free from tubercle, and we are probably justified in connecting them with the pleuritic attacks from which the adhesions found after death showed that the patient had suffered. The cardiac murmur as well as the musical sounds heard over the chest and jugular veins must be attributed to the watery condition of the blood, and possibly also to the pressure of enlarged glands on the intrathoracic vessels, thus producing in them similar murmurs to those produced by the pressure of

the stethoscope on the jugular vein. The rapid pulse and rapid respiration noticed in the later stages of the disease were probably also due in part to the anæmia, although they probably were also due in part to the increased temperature. Heat is a stimulant to the heart, and when the heart either of a frog or a mammal is warmed its pulsations are accelerated. Heat is also a stimulant to the respiratory centre in the medulla oblongata, by which the movements of respiration are regulated, and, as Fick and Goldstein have shown, when warm blood is supplied to this centre the respiratory movements become quicker and deeper, until marked dyspnœa takes place, although the blood which is circulating in the rest of the body still retains its normal temperature. The increased temperature observed in the present case was thus partly the cause of the quickened pulse and respiration, but not the only cause. For as a rule the heart beats more quickly when it has less resistance to overcome, and in this instance, as well as in anæmic cases generally, the resistance was less, the tonic contraction of the vessels being diminished in consequence of the imperfect nutrition of the nerve centre by which it is usually maintained. The spanæmic condition of the blood is a stimulus to the respiratory centre in the medulla oblongata, and will cause quickened respiration and dyspnœa. For the blood being deficient in hæmoglobin, will not convey the usual quantity of oxygen to the medulla, and deficiency of oxygen is a stimulus to the respiratory centre contained in it.[1] In ordinary cases of anæmia this effect of the condition of the blood is only manifested after exertion, but in this one the natural effect of the spanæmia was increased by the raised temperature, and the painful dyspnœa which preceded death was probably due to their combined action.

But now we come to the real difficulty, viz., an explanation of the spanæmic condition. The supply of materials for assimilation may be defective, or the constituents of the liquor sanguinis, which is to make up the red globules, may be absent. Is there some poisonous element which gains an entrance into the blood, and, if I may be pardoned for using such an expression, causes a "fatty catalysis" in the

[1] *Text-book of Physiology*, by Michael Foster. Third edition, p. 340.

blood, so that the solid constituents undergo the same chemical process as Quain considers analogous to that by which adipocere is produced after death? Is there some fault in the nervous supply to the lymphatic glands, and so causing them to elaborate pernicious material for the blood-supply? Fat was found in many tissues in this case, although neither phosphorus nor arsenic was given. It is quite an open question whether marsh miasm plays any part in this disease. My patient was a native of Lincolnshire, and Dr. Bradbury of Cambridge had a patient who was a native of Cambridgeshire who seems to have suffered in a similar way.

If we take up the first alternative and inquire whether the constitution of the blood was due to defective assimilation or not, we notice at once in our notes that the colour of the skin which gave us an index to the condition of the blood was quite out of proportion to the general nutrition. In other words, the nutrition of the red corpuscles had suffered much more than that of the other tissues of the body; and we are thus led to inquire in what respects the normal conditions of nutriment of the corpuscles differ from those of the other tissues. The other tissues waste and are repaired, new material being brought to them by the arteries and removed by the veins and lymphatics *in situ*, but the blood itself is in constant circulation. The place where the red corpuscles are chiefly destroyed is in all probability the spleen, and the organs in which the hæmoglobin they contain is employed to nourish new corpuscles are probably the spleen and liver. In the latter also it is probable that part of the hæmoglobin undergoes alteration previous to excretion as bile pigment.

To put the matter shortly, the nutrition of the red corpuscles takes place chiefly within the portal circulation, while that of other tissues takes place in the systemic circulation. It is, as I have said, an open question whether malaria plays any part in this disease; yet I think the conditions we find in cases of malarious poisoning may help us to understand those which occur in pernicious anæmia. A more or less anæmic condition generally occurs in persons who have suffered for some time from malarious poisoning. The recent researches of Klebs and Tommasi-Crudeli appear to prove that this poison is an alga

which, according to Lussana,[1] may remain for a long time in the portal circulation, and there act on the liver, spleen, and blood, without making its presence known by the production of an ague fit. Other poisons likewise may circulate in the portal system for a length of time, and if they should have, like the ague poison, an injurious action on the red corpuscles, either by accelerating their destruction or interfering with their formation, they will have the effect of producing anæmia. Now in pernicious anæmia we do not know of any definite poison, but as the Editor of this Journal has pointed out to me, it is possible that some abnormal product of digestion, or even some digestive ferment itself, may act as a poison. This is rendered all the more probable by the febrile condition which formed such a marked symptom in this case, and is indeed one of the most important symptoms of pernicious anæmia. This febrile condition is one which fluctuates very much, and for its occurrence no good reason has hitherto been assigned but which might be due to the occasional passage of some poison from the portal into the general circulation, as in ague.[2]

[1] *Practitioner*, vol. xxiii. p. 116.

[2] [If we suppose that some ferment in a free condition is present in the portal circulation and occasionally passes in greater or less quantities into the systemic circulation, we can understand both the destruction of the red-blood corpuscles and the fever. For Senator[3] has shown that when pus-corpuscles are treated with glycerine so as to extract any ferment that is in them, the glycerine solution will produce fever when injected under the skin of a dog. Previous to the investigations of Heidenhain indeed it was difficult to understand how some of the digestive fluids did not destroy the body itself. For the pancreatic juice will digest albuminous materials in an alkaline fluid, and there seemed to be no reason why it should not be absorbed from the intestinal tube into the blood, and then digest both the blood itself and the tissues. From Heidenhain's observations it appears probable that if absorbed it becomes again transformed from a free ferment into zymogen, which has in itself no action, although, if put under proper conditions, it may again yield an active ferment. If it happened that from some alteration in the liver or spleen such transformation should be arrested, and free ferment were to circulate in the blood, we might have such a condition as that in pernicious anæmia. This view may seem to many too hypothetical, and many more facts are wanted before it can be accepted; but still it may indicate a course of treatment quite different from the ordinary one in this disease, viz by hepatic stimulants and purgatives, a course which is often very beneficial in malarious disorders.—ED. PRACT.]

[3] Immerman in von Ziemssen's *Cyclopædia of the Practice of Medicine*, vol. xvi. p. 582, and Senator, *Centralblatt d. med. Wiss.* 1873, p. 85.

The fatty condition of the organs also seems to lend countenance to this hypothesis. It is probably due in part to deficient combustion from imperfect oxygenation, but it seems highly probable that there was increased tissue waste also, such as Voit and Bauer have shown to take place in poisoning by phosphorus. From their experiments it appears that the fat which is observed in cases of phosphorus-poisoning is not derived from the food, nor does it consist of fat which has been taken up from other parts of the body, such as the subcutaneous adipose tissue, and deposited in other organs such as the liver, but is formed *in situ* from the decomposition of the albuminous matters of the organ itself. In the healthy body, according to Voit and Bauer, albuminous substances, when undergoing retrogressive metamorphosis, split up so as to yield urea and fat which undergoes combustion and passes off in the form of carbonic acid from the lungs. In poisoning by phosphorus this fat is not only destroyed more slowly, but is formed more quickly, for the albuminous substances split up with unwonted rapidity. Consequently the other product of their decomposition, viz., urea, or substances nearly allied to it in chemical composition, appears in increased quantity in the urine, at the same time that fat is accumulating in the body. After blood-letting a similar result takes place, the amount of urea excreted being increased, while fat accumulates, so that in Germany peasants are accustomed to bleed their cows in order to fatten them, and a tendency to obesity sometimes occurs after profuse flooding. The reason why fat should accumulate from non-combustion in anæmia is clear enough: the blood, containing few red corpuscles, and consequently little hæmoglobin, does not convey sufficient oxygen to the tissues to allow of the combustion being properly carried on, so that the fat remains instead of being burned off. But it is not so easy to understand why blood-letting should accelerate the metamorphosis of albuminous tissues (though the increased quantity of urea it occasions the urine is a proof that it does do so) unless we assume that after the withdrawal of blood from the systemic circulation blood passes with it from the portal system, carrying with it ferments which, acting like that obtained by Senator from pus, accelerate tissue-change and raise the temperature.

Whether any change of a similar sort occurred in the above case or no, at all events I think we see in it the vascular system very much at fault. Whether the primary change is induced in this system or in the nervous system is a question. We know that the nervous system, especially the sympathetic, has an inhibitory power over the vascular; yet I must admit that physical processes cause changes in the blood during respiration and absorption, and any alteration in the nervous system may be frequently traced to these causes. I do not endorse Dr. Bradbury's remark that the nervous system is a "refuge" for those who cannot give a satisfactory explanation of this disease. I think with deeper research we shall find that the nervous system plays a very important part in this affection, and I am glad to see that this view is supported by Dr. Simon, who, at the Manchester Medical Society, pointed out the analogies this disease formed with "Addison's disease," and that its course pointed to a nervous origin. With regard to the treatment, remedies were merely addressed to symptoms as they arose. A great deal has been said and written about treating symptoms and not the disease, but I think a great many physicians will admit that they more often use an *à posteriori* line of argument in treating disease than the opposite; manifestly cause and effect are not the same, but in the perception of things, psychologically, synthesis precedes analysis. With pioneers such as Lockhart, Clarke, Wilks, Moxon, *et hoc genus omne,* we ought to strive to record all facts tending to elucidate the multifarious and intricate questions that may arise in the history of disease. In conclusion let me quote Braxton Hicks in his oration at the Hunterian Society some years back, "We all need to cultivate the habits of fairly bringing to its logical conclusion everything that is presented to us: let us, like the great Humboldt, live longing for fresh truths."

CASES OF ARSENIC POISONING FROM WALL-PAPER AND DRESS.

BY FRANCIS E. IMAGE, M.B. CANTAB.

I THINK that general consensus of medical opinion points very strongly to the want of some interference on the part of the legislature with the employers of arsenic and its compounds in the manufacture of articles of ornament, dress, and wall-papers, and with a view to help forward the movement that has now been set on foot, I am induced to give publicity to the following cases which have come under my care.

1. A brother and sister of eight and seven years of age respectively—in consequence of an alteration taking place in the house, their nursery was changed; they were both somewhat delicate children, suffering at times from enlargement of the glandulæ concatinatæ from slight exciting causes. The walls of their own nursery were varnished, but the room in which they were placed during the alterations was a smaller one, the ventilation not so good, and it had not been papered for many years. After living in this room a fortnight they began to suffer from conjunctivitis, which did not yield as readily to treatment as I could have wished, but which soon got well when they returned to their own room after the alterations were completed. The paper of the temporary nursery had a white ground with bright green flowers on it, and by Reinsch's test gave an abundance of arsenic.

2. A young lady, age 23, went to a ball in a beautiful bright green tarlatan dress, and on the following morning woke up with a severe headache, soreness of eyes, and colicky pains in the abdomen, which symptoms passed off without requiring

medical aid, but as they recurred more severely a short time later, after going to another dance and wearing the same dress, they were referred to me. The dress had large quantities of Scheele's green loosely attached to the fibres of the material.

3. In the autumn of 1878 I saw a housekeeper, age 47, a healthy woman at the climacteric period of her life, but never subject to headaches. After living about six weeks in her keeping-room, which had recently been papered with a dull greyish artistic green, with red pomegranates, she began to suffer pain in the right supraorbital branch of the fifth nerve, which gradually became more severe. As I thought her habits too sedentary, I ordered her to take more open-air exercise and gave her quinine; but as commensurate improvement did not result I gave her Fowler's solution instead, which to my surprise made her worse, so that I had to cast about for some extrinsic cause. The place she lived in was not damp nor near marshes, but being suspicious of the paper, I examined by Reinsch's process and found arsenic in large quantity. On stating the result of my examination to the owner of the house, he was much surprised, and said he was informed on choosing his papers at a first-rate London upholsterer's that they were non-arsenical. The paper was removed and the walls re-papered with an innocuous one, and as an experiment no medicine was given to the housekeeper: gradually the neuralgia subsided. The woman did not seem to have any hysterical tendency, and therefore I attribute the symptoms to arsenical poisoning.

CAPRI AS A HEALTH RESORT.

BY T. LAUDER BRUNTON, M.D., F.R.S.

THE scenery of the Bay of Naples is proverbial for its beauty, and is assuredly unsurpassed by that of any other place in Europe, and probably of few, if any, in the world. It forms a crescent, the concavity of which is directed to the south-west, and each horn of the crescent is capped, as it were, and prolonged, by one or two islands. The position of these reminds one of the balls which are often fastened upon the horns of a cow given to pushing, only that in the case of the Bay, the appendages, instead of being affixed to the promontories which form the horns, are situated at a little distance from them. The prolongation of the western horn consists of the small flat island of Procida, and, beyond it, of the larger and bolder island of Ischia, while the single island of Capri forms the termination of the eastern horn. Procida possesses few points of interest. Ischia is considerably larger, being about nineteen miles in circumference, and its scenery is much more varied. In the centre rises Mount Epomeo, to the height of 2,600 feet. On the northern shore is situated the town of Ischia, with warm sulphur springs, which were formerly in considerable repute, and are still much used by the Neapolitans. There is a great deal of fashion in such matters, and few English people resort to this island in the winter, but such gouty or rheumatic people as generally go to Aix-la-Chapelle or Aix-les-Bains in summer might find themselves benefited by a visit to Ischia when the cold of winter renders it disagreeable and unadvisable to sojourn in the watering-places just mentioned. The finest view in all the beautiful Bay of Naples, is, I think, to be had from this

island, and the view which I had in the month of May, twelve years ago, from the terrace in front of the hotel in Casa Micciola, a little town about a mile and a half to the west of Ischia, was the most wonderful I have ever seen. From the vicinity of the terrace a deep, well-wooded depression stretched down towards the sea, and the rich foliage of the trees which covered it formed a magnificent foreground. On either side rose bare cliffs, which framed in the picture. In the middle distance lay the calm, blue Mediterranean, studded here and there with white lateen sails. Beyond stretched the coast, with Baiæ and Naples glittering upon it, and Vesuvius behind sent up a cloud of smoke which trailed away like a long curtain into the far distance. The whole was bathed in the rich mellow light of the setting sun, and formed a picture such as one sees but few times in the course of one's life.

Ischia was at one time the property of the Emperor Tiberius, who exchanged it for the island of Capri. At my first visit to Capri in the month of May I could not understand what could have induced the Emperor to give up so beautiful an island for one so much smaller, and, at first sight, so much less attractive, as Capri. On the second occasion, however, in last November, I began to understand why Tiberius, who wished a residence for the whole year, and not merely for the summer months, had chosen Capri. The most beautiful side of Ischia is the northern, and this being partly sheltered from the south by the high ground in the middle of the island, is agreeably cool, and much resorted to by Italians during the summer. But this northern exposure, so agreeable during the heat, is disadvantageous in winter, and, notwithstanding their proximity, the rainfall is considerably greater in Ischia than Capri.

Capri is situated in 40° 30′ North, and 11° 50′ East. It is a small island, being only about eleven miles in circumference, about three long, and, at its narrowest part, about half a mile broad. It is very irregularly saddle-shaped, reminding one not so much of the modern saddle as of the tilting saddle, with high projections in front and behind, which was used by the knights in the tournaments of the middle ages. The western end of the island, and the larger in every way, is called Anacapri. It is about two miles long, rather more than two miles broad, at

its broadest part, and from it Monte Solaro rises to a height of 1,980 feet. Throughout its greater part Anacapri is about 800 feet high, and at its eastern end it breaks suddenly down in steep cliffs, the face of which it was formerly necessary to descend by long stairs in order to reach the eastern part of the island, or Capri proper. This eastern end is about a mile and a half long, and about half a mile broad. What may be termed the seat of the saddle is just under the cliffs of Anacapri, and is between 400 and 500 feet high, and it gradually rises again to the extreme east at Lo Capo to a height of 1,050 feet, when it breaks down in sheer cliffs to the sea. Indeed all round the island the cliffs are very precipitous, and there are only two landing points above the middle of the north and south sides, called the Grande and the Piccola Marina.

The town of Capri contains between 2,000 and 3,000 inhabitants, and is situated just on the saddle, having the steep cliffs of Anacapri rising at a short distance to the west, and the sloping ascent to Lo Capo on the east. About the centre of the town is a little piazza, and to the north and south the ground slopes away to the Grande and Piccola Marina. The whole town has an exceedingly Eastern aspect, its flat roofs, whitewashed houses, and dark-covered archways strongly reminding one of such towns as Bethlehem or Hebron. Every available foot of ground is cultivated, and the steep slopes are covered with terraced vineyards or olive-groves. A few fig and mulberry-trees are scattered here and there, but there is in summer a lack of the masses of rich foliage which Ischia presents. The dull green of the olive cannot bear comparison with the brightness of other trees during summer, but in autumn and winter it preserves its appearance very much better than they, and thus the appearance of Capri is very much less changed by the approach of winter than is that of the sister island.

Capri lies about twenty miles to the south of Naples, and may be reached either by sailing-boat or steamer. A market-boat sails between Naples and Capri three times a week, performing the journey in three or four hours, the length of passage depending on the weather. A steamer also plies between Naples and Capri, touching at Sorrento, once or twice a week in winter, but daily during early autumn. The steamer also

takes two or three hours, and is very unpunctual in starting, and unless it has a sufficient number of passengers does not go at all. I believe, however, that arrangements are now being made for a postal steamer to convey the mails daily from Naples to Capri, whether there are passengers or not.

Another way of reaching Capri is from Sorrento, and a private sailing-boat may either be hired by the traveller for himself, or he may cross in the post-boat which plies daily between the two places. The slowness of the steam voyage from Naples to Capri is accounted for by the fact that it has not only to make a long *détour* in order to touch at Sorrento, but stops for some time at the Blue Grotto, so that the passengers may have an opportunity of seeing that interesting phenomenon before they land.

Formerly there was no road at all in the island practicable for carriages, and the only means of conveyance were horses and donkeys, and all goods for Capri were carried up the long stairs on the heads of women. Of late years, however, an excellent carriage road has been made from Capri up to Anacapri, winding in zigzags up the steep cliffs, and another road is now in course of construction from the town of Capri to the Grand Marina.

Capri may be reached from England either by taking the train to Marseilles and steamboat to Naples, or by railway through to Naples by the Mont Cenis route. Another route might perhaps be still more advantageous for invalids, viz., to take the train direct to Brindisi, and then back to Naples. The advantages of this mode of travelling are that the Pullman car runs through direct from Calais to Brindisi, so that the journey can not only be accomplished in less time and with less fatigue, but the annoyance of frequent changes is avoided.

From its insular position and small size, the climate of Capri is essentially a sea climate, resembling that of a ship in mid-ocean.

A sea climate, as Dr. Faber points out in his admirable articles on the influence of sea-voyages,[1] differs from a land climate in the quantity of moisture and the equability of temperature. It is perhaps the equability of temperature in Capri that is its most striking feature, and any one who is accustomed to the

[1] *Practitioner*, vol. xvi., &c.

sudden changes which occur even at the usual health-resorts along the Riviera would be greatly impressed by this fact. For example, on first visiting Mentone the traveller is greatly astonished at the sudden chill which is experienced as soon as the sun sinks below the horizon, and in Egypt the cold which one feels about midnight or in the early morning is so considerable as to give one quite a new conception of what Jacob meant when he said that in the day the sun consumed him, and the frost by night. At Capri, on the contrary, one hardly notices the setting of the sun, except by the failure of light, and after sunset one may stay outside, drinking coffee and enjoying the quiet, without any feeling of chilliness whatever. The difference between the sea climate of Capri and the land climate of Naples was impressed upon me in a somewhat unpleasant way; for being accustomed during my stay on the island to be out at and after sunset, it did not occur to me that it might be unadvisable to remain out after sunset at Naples. I went out for a drive accordingly, and, not returning to town till after dark, I suffered from the consequences of the unwonted chill.

Another characteristic of Capri is its dryness. The quantity of rain which falls in the island is considerably less than that which falls on the shores of the Bay or on the island of Ischia. The inhabitants can often see the clouds driving overhead, and breaking in rain upon Monte Epomeo, in Ischia, or upon the heights behind Naples, while not a drop falls on their island. Sometimes this is agreeable, but at other times it is excessively tantalising. At present, for example, there has been very little rain since May last, and the inhabitants are suffering from want of water. All the wells are dried up, and a subterranean Roman cistern, their last resort, has been reopened with great pomp and ceremony, after being closed for twenty years. To this all the people of the island daily go, and when its waters fail no other resort will be open to them but to bring water from the mainland. Another feature of the climate of the Island of Capri is the amount of light. Overhead there is generally a clear bright blue Italian sky, and around is the ocean, which reflects more or less light upwards. Even in days when rain does fall it rarely falls during the

whole of the day, so that walks may be taken either in the forenoon or afternoon. One objection which has been raised in respect of Capri is that it is so exposed to winds, but it is, I think, a fallacious objection. Winds there are, no doubt, and it is not sheltered from either the south or the north wind by a high prominence, as Mentone is. But the winds are of less importance than they would otherwise be if the island had a different shape; but since it has the form of a saddle, lying east and west, the high projection of Anacapri on the west and Lo Capo on the east shelter it from easterly and westerly winds, while the town, situated in the middle of the saddle, is exposed to the northern and southern winds. And an invalid who desires exercise may readily get it without exposure by simply descending from the town to the slope on either side. If the south wind be blowing he can choose the north slope for his peregrinations, while if the north wind prevail he will of course prefer the southern slope.

There are not very many walks about the island, if by walks we understand roads or footpaths; but the excursions which may be made in all directions through the vineyards and olive-groves are both numerous and interesting.

The question of accommodation and food is one of great importance to invalids, and both of these are exceedingly good in Caprì, in one hotel at least, and we believe in most of the hotels in the island. The Hotel Quisisana is situated on the southern slope of the saddle, and thus gets plenty of sunlight, while it is somewhat protected from the north wind. From it one may walk directly over the southern slopes when the north wind is blowing. He may reach the northern slope by a gentle ascent of little more than 100 yards. The rooms are well fitted up, and furnished with English fireplaces; the food is abundant, the *cuisine* good; and in place of the abominations that one often meets with in Continental hotels, the Quisisana is provided with earth closets, which are carefully tended and kept in most perfect condition. The manager, Mr. Frederico Serena, not only speaks English well, but thoroughly understands English customs and habits, and, in addition to courteous manners, possesses a kindness of heart which leads him to take the greatest trouble and pay the utmost possible attention to those who are sick. Another

recommendation to this hotel is its cheapness, the pension being only eight francs a day, wine included.

The disadvantages of Capri are—the length of the journey to Naples, the irregularity of the steamboat from Naples, and the difficulty of crossing in bad weather. The boats are small, and if the weather be stormy they do not ply, and it may be dangerous to cross in a small boat, so that it occasionally happens that the traveller may not be able to cross to Capri from Naples, nor to get to the mainland from Capri, for several days together. Another disadvantage is that the cable is not laid to Capri, and telegraphic messages are conveyed from a station on the mainland by means of a semaphore. This does not greatly increase the length of time required for the transmission of the messages in fair weather, but it has occasionally happened that a sea-fog has prevented messages from going at all. Another inconvenience is the want of a road from the landing-place to the town, so that the invalids must ride up on donkeys, or be carried in chairs. There are, it is true, hotels close to the landing-place; but as these have a northern exposure they are not so suitable for invalids. The last disadvantage is the want of a resident English physician.

From what I have stated, it is evident that Capri is not to be recommended as a healthy resort for patients in an advanced stage of consumption, who cannot well bear the long journey, or undergo a little physical exertion, or who are liable to sharp intercurrent attacks likely to render necessary the attendance of a skilled physician. On the other hand, this island possesses a warm, equable climate, with bright sunlight and opportunities for exercise. It seems to me to be admirably suited for patients in the early stages of phthisis, in whose cases we wish to avoid the dangers of exposure to cold and damp, and desire to increase in every way the nutritive powers of the system. Residence in Capri might, I think, in many cases be very properly and profitably substituted for a long sea-voyage, for the island might almost be compared to an enormous ship moored in an advantageous latitude. Instead of the discomforts attendant upon the cramped accommodation of the state-room and the limited space available for exercise on board ship, one may have in Capri the same climatic benefits, together with comfortable rooms, pleasant shelter, and varied excursions.

Reviews.

The Medical and Surgical History of the War of the Rebellion. By J. J. WOODWARD, Surgeon in the United States Army. Washington: 1879. 4to. pp. 869, with chromolithographs, photographs, and woodcuts.

THE subject of this thick and closely-printed volume, which is the second of the medical part of the history of the war, is "the alvine fluxes," diarrhœa and dysentery. In this, as in many other campaigns, from Agincourt to Walcheren, these were the most common diseases of the camp. During the war no less than 1,740,000 cases of bowel complaints were reported in the Federal armies, and of these nearly 45,000 are known to have ended in death. These numbers include about a tenth of the cases among the coloured troops, but exclude an unascertained number among three regiments of Indians and half-breeds.

We may congratulate the government and the profession in America upon the industry, learning, and skill which Dr. Woodward has shown in the completion of this monumental work. The enormous mass of materials is arranged clearly and conveniently, previous sources of information are not only referred to but quoted and criticised, and the writer's own comments are remarkable for moderation and sound judgment. The print, though excessively small and closely packed in the notes, is clear and remarkably free from errors. The coloured lithographs are for the most part very good, some are particularly admirable, and on the whole are superior to any series of pathological drawings not coloured by hand which we remember to have seen. The photographs were at first reproduced by the Woodbury type process (used by the younger Agassiz in his *Revision of the Echini*), but in the later copies the Heliotype process was used. The unmagnified views of diseased intestine are beautifully clear, and probably show the lesions better than any lithograph, etching, or engraving, but the microphotographs, though executed with equal care, appear to us to be inferior for illustration to the woodcut "diagrams" which are given to explain them. Except for such objects as hard vegetable tissues, foraminifera,

shells, or bone, exact representations of microscopic sections are of little value. Interpretation of the appearances is almost always necessary, and it is better that this should be admitted by the draughtsman.

Dr. Woodward does not regard the presence of a false membrane, or even of ulceration of the colon, as necessary to the diagnosis of dysentery. He calls by this name all cases of diarrhœa in which tenesmus was present, and accordingly makes his primary division of the alvine fluxes into acute and chronic diarrhœa, and acute and chronic dysentery, the latter including simple and diphtheritic inflammation. This classification, though unsatisfactory from a pathological point of view, is, we believe, justified by the nature of the material, and by the uncertainty as to the anatomical lesions in even the more fully recorded cases which ended in recovery. That ordinary catarrhal diarrhœa, or muco-enteritis, is not a disease peculiar to the small intestine is amply proved: the colon is the seat of irritation in the great majority of cases of diarrhœa which are not due to specific causes, as tubercle and enteric fever. The account of the *post-mortem* appearances of the intestine is elaborate and excellently illustrated. No less than 782 more or less complete accounts of necropsies are given. It is worthy of remark that in 156 cases of chronic catarrhal colitis, abscess of the liver only occurred once. On the other hand, in 396 cases of chronic ulceration without false membrane, there were six of single, and ten of multiple, abscess; and in 115 cases of chronic diphtheritic ulceration, three of single and four of multiple abscess. In 511 cases, therefore, of ulcerative colitis, abscess of the liver occurred in twenty-three, *i.e.*, almost exactly 4·5 per cent. This is a far less proportion than what has been observed in tropical dysentery by Annesley, Parkes, and Murchison, and agrees more nearly with the comparative variety of either single or multiple abscesses in cases of dysentery in England, at Vienna, and in the allied armies during the Crimean campaign.

With regard to the etiology of diarrhœa and dysentery, Dr. Woodward discusses the influence of impure drinking water, of alcohol, and of various articles of food, but agrees with Parkes and most of the soundest heads who have considered the question, that these epidemic fluxes in armies cannot be attributed to any one constant and efficient cause. He cannot admit the specific and contagious character of camp dysentery; and holds that it is controllable by the prophylaxis of well-ordered hygienic measures. In the terrible example of the prisoners detained by the Confederates in the Andersonville inclosure, almost every known antecedent of dysentery was present—swampy ground, no shelter, coarse and insufficient food, contaminated drinking water, and over-crowding, first of the living,

and last of the living and the dead. Between February 1864 and April 1865, there were in this fatal camp 7,352 cases of diarrhœa and dysentery, and of these no less than 5,605 were fatal!

With respect to treatment: the question of diet is fully discussed, though here as elsewhere the conclusions reached are elastic and moderate rather than exclusive and precise. Dr. Woodward admits the efficiency of the prevalent treatment of dysentery in India and China by full doses of ipecacuanha, but would limit its exhibition to the acute stage, and never prescribe it where there is reason to believe that extensive intestinal lesions already exist. The use of calomel is deprecated, and a remarkable circular is quoted, which was issued from the Surgeon-General's office in 1863 and formally forbade the issue of either calomel or tartar emetic throughout the American army. It appears, however, that this prohibition was allowed to become a dead letter. The experience of the war convinced Dr. Woodward that opium is less beneficial and more often injurious than is generally supposed. He only recommends its use when required as an anodyne. Of chlorodyne he writes, "All the objections to secret remedies apply to this preparation, and all the criticisms that sound logic has offered with regard to ancient polypharmacy may be urged against the various formulæ which have been devised to imitate it: any serious discussion of its supposed virtues would be out of place in these pages." Tannin and all other vegetable astringents are dismissed as practically useless: and the salts of copper, lead, and silver are condemned as injurious. The good effect of the insoluble preparations of bismuth is admitted, but quinine is justly regarded as not deserving any reliance as a special remedy in dysentery.

The volume concludes with a series of elaborate indices: indeed the fulness and accuracy of the references throughout are deserving of the highest praise. We could wish that in the chapters on etiology, pathology, and treatment Dr. Woodward's learning and experience had allowed him to arrive at more full and definite conclusions. He seems almost overwhelmed with the multitude of the facts he has collected, and bewildered by the greater multitude of opinions. But such caution is, if a fault, a fault on the right side; and we can cordially recommend this admirable volume as a storehouse of information on dysentery and diarrhœa more full, accurate, and well-arranged than any other yet published.

Clinic of the Month.

The Hypodermic Syringe as an Aid to Diagnosis.—Dr. Greenfield has for some time employed the hypodermic syringe constantly and systematically, more especially in the diagnosis of chest diseases, when it has given valuable information as to the presence or nature of pleural effusions. It may also be employed either as an aid to treatment or for the actual treatment of such cases, as when it is decided to aspirate or to introduce a trocar. In such cases it is very desirable to determine precisely the lowest point at which fluid readily flows, and in the case of loculated effusions to fix exactly the site of puncture. By no means can this be done so readily and so exactly as with the hypodermic needle. Dr. Greenfield is in the habit in all such such cases of using this first. He often makes three or four punctures to decide upon the most favourable spot. This having been done, the size of the needle or trocar to be used can be accurately determined, as also the depth to which it must be inserted. In the case of small effusions and also in empyema in infants, the hypodermic syringe may alone be used, small quantities of fluid being removed at frequent intervals. The same means may also be employed in many other circumstances. To fulfil all the conditions required of it, the needle should be fine, with a grooved and very sharp point; it should be made of polished steel, and should be kept well tempered as well as scrupulously clean. The syringe should be rather large, made of glass, with metal fittings, and the piston always well soaked. The junction of the needle with the syringe must be thoroughly air-tight. The needle should not be less than one inch and a quarter, nor as a rule more than one and three quarter inches in length. These details are essential if the pain is to be reduced to a minimum. (*The Lancet*, Nov. 1, 1879.)

Treatment of Leprosy with Gurjun Oil.—Surgeon C. T. Peters has submitted a report which has been circulated by the Bombay Government detailing the result of the use of gurjun oil in the Roman Catholic Leper Asylum of Belgaum.

Twenty-nine patients were subjected to treatment, which consisted of (1) inunction of the whole body every morning with carbolic acid (1 in 40.) (2) A bath of warm water and soap a few hours afterwards. (3) An application of gurjun emulsion, one to three of lime water, to the affected and ulcerated parts. (4) Application of cashew-nut oil to anæsthetic and ulcerated parts. (5) Chaulmoogra oil in five minim doses with five grains of bicarbonate of soda, and an ounce of peppermint water internally. Under this plan considerable improvement took place; the sores were healed, tubercles absorbed, and sensibility was partially restored. Dr. Peters summarises the merits of gurjun oil as follows: (1) Its rapidly healing action on chronic leprous ulcers. (2) It softens the skin. (3) Prevents the collection of flies. (4) Its cheapness. (5) Its efficacy in the treatment of chronic skin diseases. Surgeon-General Hunter in forwarding the paper however remarks, that an extended trial of medical officers of gurjun oil in the treatment of leprosy has only ended in disappointment. (*The Indian Med. Gaz.* Vol. xiv. No. 9, 1879.)

Practical Notes on the Treatment of Phthisis.—Dr. Alexander states that in large manufacturing towns, such as Bradford, to the Infirmary in which he is Senior Physician, phthisis in its various forms is constantly presenting itself, and treatment is required in cases where the patients are unable to leave England. The modern treatment, which regards the morbid state upon which the disease depends and not the symptoms, has been followed by marked success. Phthisis is a disease of debility, the result of defective nutrition depending in part, but not wholly, upon an insufficient supply of nutritive food. The food may contain all the elements necessary for preserving a normal state of the blood, but if that blood is not properly aërated by the lungs, and purified by the secretory and excretory organs, nutrition becomes defective. For the treatment of phthisis, therefore, the great end to be attained is the improvement in nutrition, by improvement of the general health. The diet is to be as nourishing as the weak digestive power of the patient will allow. The food is to be thoroughly masticated and insalivated. The air of the bed-rooms and sitting-rooms must be kept pure, and as little gas used as possible. The function of the skin—since this tissue can relieve the imperfectly acting lungs—must be stimulated by an occasional Turkish bath, and by the daily use of sponging with salt and water. Sea salt may be given to hospital patients to encourage cleanliness. The measures here recommended will benefit that dyspepsia of phthisis which is one of the earliest premonitory symptoms, whilst it is at the same time one of the most obstinate. Medicine plays an important but secondary *rôle* in this disease. The

object being to improve the digestion and nutrition, nauseating drugs, such as opium, squill, or ipecacuanha, must be only seldom employed. The early dyspepsia is best treated with strychnia, followed by such an acid as phosphoric, with quinine. As a rule acids agree best, for although there is an excess of acidity in the stomach, it has been shown that it can be checked by the use of acids given before meals, an explanation of their undoubted benefit in phthisis. Cod-liver oil, cream, cod-liver oil jelly, pancreatic emulsion, and suet dissolved in milk, are all beneficial; but they should at first be given in small doses, directly after meals. The hypophosphites of lime and soda yield good results in some advanced forms of unilateral phthisis. Much has been done to improve the hygiene of all classes, but much still remains to be done, and these preventive measures alone can help to stamp out a disease so hereditary in its nature. Such a treatment as is here sketched is the only one suitable for early phthisis, and even in advanced cases there is no need to despair of ultimate success. By perseverance, even when the lungs are very seriously injured, the tubercle may become absorbed or cornified, and rendered inert. (*The Lancet*, Nov. 22, 1879.)

Treatment of Chronic Eczema of the Palm.—Dr. Lush gives the following lotion, which he has found to be beneficial in allaying the intense irritation which so often accompanies cases of chronic eczema rimosum of the palm. It consists of bicarbonate of soda 2 drachms; bicarbonate of potash 1 drachm; glycerin 1·5 drachms; tincture of opium 2 drachms; water 18 ounces. Dr. Lush considers this bicarbonate of soda solution almost if not quite a specific for the relief of the intense burning irritation which often attends chronic eczema, more especially if the patient has a rheumatic tendency. (*The British Med. Journ.*, Nov. 22, 1879.)

Local Therapeutic Analgesia.—M. Dumontpallier read a paper before the Paris Academy of Medicine upon the local therapeutic analgesia produced by stimulation of the corresponding region on the opposite side of the body. The communication was summed up under the following heads. (1) Every hypodermic injection which acts medicinally is a complex proceeding, the result being due in part to the medical action of the drug employed, in part to the influence of local stimulation. (2) The local irritation is transmitted from the periphery to the sensory centres, where it sets up certain changes resulting in the cessation or diminution of the peripheral pain. (3) The true seat, in an anatomical sense, of some forms of pain apparently felt in the periphery, is in the sensory centres. (4) Irritation

set up in *loco dolenti,* or in the neighbourhood of the painful spot, assuages the pain, or even causes it to wholly cease. So also when irritation is set up at symmetrical places upon the side of the body which is opposite to the seat of pain, such irritation often suffices completely and permanently to allay the pain. (*Le Progrès Médical,* Nov. 15, 1879.)

Treatment of Pneumonia.—Commenting upon a case of pneumonia in which speedy recovery had followed the use of ergot, Dr. Handfield Jones states that the action of the ergot seems to have been beneficial, though he does not attribute the cure solely to its agency. The ordinary pneumonia (*pneumonia franche*) which is nowadays seen in London runs a determinate course, the inflammatory processes terminating by more or less rapid defervescence about the sixth or seventh day from the initial rigor, while the exudation undergoes resorption sooner or later, according to the energy of the vital powers. Results which are therefore due in reality to the natural course of the disease must not be attributed to the remedies employed; moreover any means which affect injuriously the strength of the patient, especially those which enfeeble the heart, must be carefully avoided. Though the disease cannot be cured, its severity may be materially mitigated, and life may in some cases be preserved. Ergot and liquor ferri perchloridi may check and control the inflammation, opium may allay the pain, and calm and steady the nervous system; bark and ammonia with wine may give tone to the failing heart, especially in the collapse of the crisis; effervescing salines, or brandy and soda-water with or without a dose or two of calomel, may quiet gastric irritation, and enable the patient to take food better; quinine in large doses, or the cold bath may serve in dangerous hyperpyrexia. Dr. Jones believes that no risk should ever be incurred with the idea of cutting short the disease. He also finds that ergot has to a certain extent disappointed his expectations, when employed in the various inflammatory affections, and of those more especially in bronchitis. (*The British Medical Journ.,* Nov. 29, 1879.)

Faradization in cases of Chronic Alcoholism.—Dr. Lush believes that the application of electricity is a remedial agent which is of the utmost value in the treatment of chronic alcoholism. He has lately had many opportunities of testing its efficacy, and is convinced of its very great use in suitable cases. He has found that the application is most advantageous in cases which may be classed under the second of the divisions into which Dr. Atkinson divides alcoholism (the *Practitioner,* vol. xxii. p. 34), viz., when drowsiness, a shattered nervous system, constant vomiting, and a great want of bodily and

mental power are the marked symptoms. The use of galvanism is of course to be combined with other hygienic and medicinal remedial measures. A moderately strong constant current battery is to be employed. Dr. Lush hopes shortly to publish particulars of several cases which have derived marked and permanent benefit from the use of galvanism, and he will be glad to receive communications from those who have had experience of this method of treatment. (*The Lancet*, Nov. 29, 1879.)

Stimulants in the Treatment of Typhoid Fever in Infancy.—Dr. A. Jacobi strongly urges that in the treatment of tyhoid fever occurring in young children, attention should be paid to the general condition of the patient. Now and then, even when there is not much fever, stimulants may be used, as they are especially indicated in all infectious diseases. Thus a child of almost any age, from one year and over, may take an ounce of brandy or whisky within the twenty-four hours not only with impunity but even with advantage when suffering from fever. In no case however should the stimulant be given alone, for its action upon the physiological function of the stomach is disagreeable ; therefore, it should always be administered in milk, water, or barley water, &c. In occasional cases stronger stimulants, or a combination of stimulants will be required. Camphor is an excellent stimulant, and to a child of 2—4 years of age, two to ten grains of camphor may be given daily for a considerable length of time. Carbonate of ammonia is also a good stimulant, but its effect is very transient, and the dose has to be frequently repeated, whereas the effect produced by camphor is more persistent. Musk is perhaps the most powerful of all stimulants ; it may be given to a child of two years old, who is in a state of collapse, to the extent of one to two grains every hour. If an efficient stimulus is required, the musk may be given in such doses as will reach twenty-five grains in the course of twenty-four hours. At the same time, when a speedy result is required, reliance must not be placed upon the stomach. In such cases hypodermic injections of ether, brandy, alcohol, or camphor dissolved either in ether, oil, or brandy, must be made, care being taken when camphor is dissolved in oil, ether, or brandy, that the solution is not too strong, for if it is the ether or brandy will be absorbed within a very short time, whilst the camphor will remain in the subcutaneous tissue. (*The New York Medical Record*, Nov. 1879.)

Vaselin in Gynæcology.—Dr. De Sinéty believes that in obstetric practice, perhaps more than in any other branch of medical science, fatty materials are required to facilitate the various methods of investigation, as for manual exploration, for

the introduction of the speculum, or as a vehicle for other remedies. Oil, wax, and glycerin are the fatty bodies most in use at the present time, but of these the great objection to the oil and wax is that they are liable to become rancid, a change which carbolic acid is powerless to prevent. This antiseptic, whose effects are so marked upon many of the lowest organisms, more especially upon those which give rise to putrefactive products, seems unable to prevent the progress of certain chemical combinations which are not the result of animal or vegetable growth, and it is for this reason that carbolised oil acquires in a short time a very disagreeable odour. Glycerin, although very useful as a remedy in some conditions, is but ill adapted to facilitate the gliding movement of the finger or of the instruments. In consequence of the inconveniences attending the use of these substances some gynæcologists have recommended the employment of soap in place of fatty bodies when making a digital examination: but in this practice Dr. De Sinéty feels himself unable to agree, and he therefore advises the use of vaselin. The product which is obtained from petroleum is oily and odourless, whilst it does not become rancid, and is insoluble in water. Till the present time this substance has been entirely employed for the preparation of ophthalmic ointment. Vaselin has been employed with good results as a soothing remedy when applied on a pledget of wool to the neck of the uterus. Carbolised vaselin is found to be more convenient than the pure substance, and it may be used not only to anoint the finger, but as a topical application in the case of certain ulcerations of the neck of the uterus. Vaselin may be mixed with iodine, potassium iodide, and belladonna, but the experiments are not as yet sufficiently extended for any opinion to be given as to their utility. The following formulæ have been employed with success; they may be used as bases for the incorporation of other remedies.

1st Formula.	2nd Formula.
Carbolic acid 1 gram.	Iodine 1 gram.
Vaselin 50 grams.	Potassium iodide 4 grams.
	Vaselin 30 grams.

(*Le Progrès Médical*, Nov. 29, 1879.)

On Benzoate of Soda.—At the meeting of the Znaim Association of Physicians in Mähr-Budwitz, Dr. Ullman read a paper on new remedies, in which he states that benzoate of soda was recommended by Prof. Klebs for all infectious diseases created by vegetable parasites. Letzerich especially praised benzoate of soda as a remedy for diphtheria, but experiments with it in Vienna have not proved successful, &c. If we now

investigate the series of experiments by Dr. Gnändinger, we find that the patients were taken to the Children's Hospital of Dr. Wiederhofer, of Vienna, from two to five days after they were affected. We further observe, that in the children who died, transmitted exudations, acute morbus Brightii, hæmorrhages of the peritoneum, pronounced disease of the lungs, bronchiectasis, bronchitis, atelectasis, florid rachitis, &c., were found; that therefore, in some of them serious secondary phenomena, and in others either constitutional diseases or other affections existed by which the capability of resisting the diphtheritic process had been considerably reduced. The majority of those who died were badly nourished and weak. It is obvious that, under such conditions, even the best and most careful treatment, as well as the best and safest method, cannot command great success. Benzoate of soda, although very effective, has, therefore, been tried under very unfavourable conditions. He maintains, however, that benzoate of soda has, of all remedies hitherto known, the most favourable therapeutic influence on the diphtheritic process, although it will probably never answer such expectations as those of Gnändinger. Many other practitioners have also employed this remedy for other infectious diseases with favourable results. Dr. Ullmann concludes this article with a brief description of the following remarkable case:—Amongst other children, a boy, eight years old, was two months ago taken ill with diphtheria of the tonsils, and violent general symptoms. On the second day of the treatment the morbid process, nevertheless passed into the larynx, the patient had the barking cough, and severe symptoms of stenosis of the larynx appeared. Besides 15 grams of benzoate of soda to be taken internally every day, Ullmann also ordered this remedy to be inhaled in a solution of 10 per cent., by means of a steam-inhaling apparatus, every two hours, after which treatment abundant blood-coloured, doughlike diphtheritic coats were ejected by coughing. After five days the boy, who had been given up, was cured, but he did not regain his proper voice for a fortnight. (*Allgemein. Med. Chir.*, Oct. 1879; *London Medical Record*, Nov. 15, 1879.)

Extracts from British and Foreign Journals.

The Use of Iodide of Potassium and Calomel in Ophthalmic Practice.—Dr. W. F. Schlaefke has an interesting article on this subject in vol. xxv. part 2, of *Graefe's Archives.* A few cases have been recorded in which iodide of potassium was being employed internally, upon calomel being insufflated into the conjunctival sac, a violent inflammation of the mucous membrane immediately occurred. Nothing of the kind had been observed so long as only one of these remedies had been employed. In order to ascertain the cause of this remarkable occurrence, Dr. Schlaefke undertook a number of chemical experiments, and experiments upon animals, which have led him to the following conclusions. Iodide of potassium taken internally is very rapidly diffused through the organism, and in a short time makes its appearance in the various secretions and excretions, and may be found in the tears within a few minutes. Iodide of potassium taken twice a day in doses of 0·5 gram is constantly present in the tears in appreciable quantities. Calomel is but slightly soluble in water, but is ten times more soluble in a $\frac{3}{4}$th per cent. solution of chloride of sodium. Calomel powder dusted into the conjunctival sac is dissolved by the tears. If iodide of potassium is present in the tears at the time the calomel is insufflated, iodate of mercury and iodide of mercury are formed. These substances have a caustic action and give rise to violent inflammation. (*Dublin Journal of Med. Sci.,* October, 1879.)

Treatment of Uræmia by Injections of Pilocarpin.—M. Leven read before the Biological Society of Paris at its meeting on the 12th of October an account of a girl, aged 16, who suffered from albuminuria, and who was suddenly seized with convulsions accompanied by complete anuria. Hydrochlorate of pilocarpin was injected subcutaneously, the third injection alone appearing to have any effect. The patient, who had previously been comatose, was then capable of being roused, and she perspired freely, whilst saliva was profusely excreted. The convulsions entirely ceased after the fourth injection, and the patient was cured. During the whole time of the uræmic

symptoms the temperature oscillated between 37° and 38° C., whilst the saliva contained nearly ten per cent. of albumin. (*Le Progrès médical*, October 25, 1879.)

The Hæmostatic Action of Subcutaneous Injections of Ergotin—M. Bénard has studied the action of hypodermic injections of ergotin in arresting hæmorrhage. The author understands by the phrase "injection of ergotin," a pharmaceutical preparation which allows of the administration of the active principles of the remedy which it represents in an easy and safe manner. The best ergotin will therefore be that which most nearly approaches ergot in its therapeutic effects. The author first reviews briefly the history of the use of ergot as a hæmostatic. He then considers the various preparations of ergotin and shows that they are not all alike, and afterwards explains how they are to be used for the purposes of stopping hæmorrhage. The second part of M. Bénard's thesis is devoted to the consideration of clinical facts, and to the study of the therapeutic value of ergotin. The author subdivides the use of the drug into three classes, according as it acts by checking hæmorrhage in a single organ, which (*a*) is not composed of unstriped muscular fibre, or (*b*) which is wholly, or (*c*) almost wholly, composed of such unstriated tissue, as in the case of the uterus. M. Bénard further gives observations in regard to epistaxis, purpura hæmorrhagica, cerebral (?) hæmorrhage, pulmonary hæmorrhage, hæmoptysis, gastro-intestinal hæmorrhage, and hæmorrhoidal hæmorrhage. The last paragraph is devoted to metorrhagia in its various forms: it is worthy of notice that in cases of metritis and in fungoid growths ergotin appears to be powerless to arrest the flow of blood. In the third part of his work M. Bénard is employed with the posology of the subject, and with the means necessary for the prevention of those unpleasant results which occasionally occur from the use of the injections. The pain and local inflammation are not more severe than those which follow upon the injection of morphia, any abscesses and scars which may result are attributed by M. Bénard to the carelessness of the operator, or to faulty preparations of the drug. Slightly concentrated solutions are recommended as the most certain guarantee of the harmlessness of the process. The general phenomena of acute ergotism only appear after injections which have been repeated very frequently, and all symptoms are at once allayed by cessation of the treatment. No mention is made of cases of chronic poisoning, due no doubt to the fact that the number of injections was never sufficiently great to reduce the subjects to this condition. (*Thèse de Paris*, 1879. *Le Progrès médical*, Nov. 1, 1879.)

Salicylate of Soda in Gout.—M. Bouloumié has communicated to the Medical Society of Paris the results of his investigations upon the action of salicylate of soda during an attack of gout. The author has administered the salicylate to some of his own patients, and he has inquired of a large number who came to Vittel for treatment, whether or not they had been subjected to this method. His own patients had only been slightly benefited by the drug, and of thirty-nine patients whose cases he directed at the mineral springs, only six had taken salicylate of soda, though they did not appear to be much relieved thereby. Whilst he recognises, therefore, that salicylate of soda acts by assuaging the pain, M. Bouloumié would restrict its administration in chronic gout. He points out the inconveniences and even the dangers which may arise from its use, especially if the heart or kidneys be affected, whilst the results are but slight except in very favourable or in subacute cases. He believes that the drug is an active remedy, which should be kept in the therapeutic arsenal to combat gout, though its action in this disease is not so marked as in rheumatism. (*Le Progrès médical*, Nov. 1, 1879.)

Benzoate of Soda in Diphtheria.—Dr. Letzerich has successfully treated, with benzoate of soda, twenty-seven cases of diphtheria which came under his care during an epidemic of the disease in Berlin. Of these cases eight were severe, accompanied by high fever, delirium, retention of the urine and fæces, existing often before the extensive local affection had made its appearance. In the blood there were found numerous bacteria and plasma corpuscles from which by cultivation in veal broth, very large colonies of micrococci became developed. The dose of sodium benzoate for children and adults is to be regulated by the weight of the body. The formula for infants under one year old is:—

℞ Sodæ benzoat. pur 5·0	or Sodæ benzoat. pur. ʒj.
Aquæ distillat.	Aquæ distillat.
Aquæ menth. ppt. āā 40·0	Aquæ menth. ppt. āā ℥j.
Syrup cort. aurant. 10	Syrup cort. aurant. ʒij. M.

Half a tablespoonful every hour.

The dose for children between one and three years of age is given as 7-8 grams (two drachms) dissolved in three and a half ounces of the vehicle, the whole amount being given in the course of the day, in half to one tablespoonful doses. For children between three and seven years of age, 8-10 grams (2-2½ drachms), given in the same way. Those over seven years old take 10-15 grams (2½-4 drachms), and for adults the dose is 15-25 grams (2½-6

drachms) daily in $4\frac{1}{2}$ ounces of the vehicle. An unpleasant after effect has never been observed even in young infants. The diphtheritic membrane was treated with benzoate of soda in powder, being sprinkled on or applied through a glass tube or quill. There is no slough formed, and thereby the danger is averted of its acting as a firm covering under which an energetic development and growth of the organisms can take place. The insufflation was made every three hours in severe cases, in the middle forms two or three times daily. With older children a simple solution of the salt (ten to two hundred) was used as a gargle. The author also recommends this remedy in gastric or intestinal catarrh, particularly of infants, and states that at times the results are surprising in these latter cases. He recommends it likewise in mycotic catarrh of the bladder, and firmly believes in the statement of Klebs that it is to be recommended in all diseases which originate by infection. (*The Boston Med. and Surg. Journ.*, July 17, 1879; from *Berlin Klin. Wosch.*, Feb. 17, 1879.)

Proper Time for Ligaturing the Umbilical Cord.—Mr. Budin, who has recently investigated this subject, concludes that the cord should not be ligatured and cut until the expiration of one or two minutes after the complete cessation of the blood flow through it. This result is based upon the following physiological reasoning. At the time when extra-uterine succeeds to fœtal life, the lungs become dilated, and blood as well as air passes into them. The blood of the infant, which is still in communication with the placenta, returns to the umbilical vein, and passes into the lungs and general circulation of the fœtus. As long, therefore, as the pulsation in the cord continues, so long the placento-fœtal circulation is going on, and so long a certain quantity of blood is thrown by the umbilical arteries into the placenta. (*Le Concours Medical*, Aug. 23, 1879.)

Treatment of Colour-blindness by the Use of Fuchsin.—Mr. Keyser has recently tested the suggestion of Javal as to the cure of colour-blindness by the use of a solution of fuchsin between thin plates of glass. The result has been to a certain extent satisfactory. The patient, a dyer by trade, had been colour-blind from his birth. He was unable to distinguish purple from blue, and failed to see red on green or blue. A grey brown appeared as green, a clear brown and olive brown were one colour. He could not distinguish a red tinge in a mixture of yellow. On several occasions he was tested by day and by night with an aqueous solution of fuchsin (gr. i. to f. ℥j.) contained between two thin glass plates which were held before the eyes. On every occasion the colours became clear. All blues became

bluer, browns were distinguished, red tinges were seen in shades which could not be previously made out. Purples and blues were distinct, and the red on the purple became clearly defined. The difference between brown and olive was distinctly seen. When red was placed on yellow, the red was brought out. Greens were more positive. Without the fuchsin all browns have a greenish cast, with the fuchsin the red comes out, and the green fades away showing clear brown; when there is no red in the colour the fuchsin does not cause such a shade over all the colours as it does to the normal eye. (*The Boston Med. and Surg. Journ.*, July 10, 1879.)

The Production of Hæmoglobin in Urine by Glycerin.—Schwalm has made some remarkable observations on the different action of glycerin when it is administered hypodermically and when it is injected into the veins. He has made a series of experiments to ascertain the cause of its varying action in these cases, and has arrived at the following conclusions. Dilute solution of glycerin consisting of equal parts of water and glycerin, or one of forty parts of glycerin to sixty parts of water, when injected into the veins of dogs or rabbits in a certain quantity, does not produce the appearance of hæmoglobin in the urine, whilst the same quantity injected into the subcutaneous tissue or intestine will certainly produce this appearance. Glycerin mixed with blood exerts no apparent influence upon the form or colour of the blood-corpuscles. The appearance of hæmoglobin in urine is therefore dependent upon conditions of diffusion for certain substances, such as the halogen and sulphur salts, upon which the integrity of the corpuscles depends, are withdrawn from the plasma, and the immediate solution of the hæmoglobin and lake colour of the blood is thus caused. The property of glycerin he alluded to is in all probability the cause of the difference in the results obtained after varying methods of administration which cannot be readily or satisfactorily explained on any other theory. The plasma and lymph are coloured red with dissolved hæmoglobin if the renal vessels be tied, and the excretion of urine be consequently stopped, after the subcutaneous injection of glycerin. (*Eckhardt's Beiträge zur Anat. and Physiol.*, viii. p. 167; *Centralbl. f. die med. Wiss.*, Aug. 16, 1879.)

Injection of Alcohol in Inguinal Hernia.—Sawostitsky has lately treated with successful results a case of inguinal hernia by injecting alcohol. The patient, aged 20, had a hernia on the right side of about the size of half an hen's egg. The testicle was atrophied, and lay in front of the external abdominal ring; it could easily be pushed into the cavity of the abdomen with the hernial protrusion. Sawostitsky in the course of two

months made twelve injections of alcohol, according to the method recommended by Englisch. On the first occasion only so much alcohol as would half fill a Pravaz syringe was injected, but on each of the other occasions a whole syringeful was used. The injection was employed after the atrophied testes with the loop of intestine had been replaced. At the time of writing, some weeks after the last injection, the course of the hernia appeared to be obliterated. (*Proceedings of the Moscow Surg. Soc.* 1879, No. 1, *Centralblatt für Chirurgie*, No. 37, 1879.)

Tannate of Pelletierin as a Tæniafuge.—The active principle of the bark of the *Punica granatum*, discovered by M. Tauret, and described by him under the name of Pelletierin, has been used with success as a remedy for tænia. It is given in the form of tannate in doses of 50 centigrams, followed in two hours by 30 grams of castor-oil. Dr. Landrieu describes its action as follows: in the two cases observed neither colic nor headache were occasioned. In the first the patient had been prepared by dieting, and a single dose sufficed to expel the tænia entire. In the second, though one dose did not suffice, the patient was not weakened by the treatment. The patient did not exhibit that repugnance so constantly shown to the administration of kousso or pomegranate bark. In a third case the administration of a dose of the hydrochlorate of pelletierin brought away 15 metres of worm, the only phenomena observed being diplopia and a slight tendency to syncope, both of which soon passed off. The pulse and temperature were not influenced by this medicine; nor were the kidneys in any way affected. The medicine seemed to have an elective and toxic action, operating solely on the tænia. (*Journ. de Med. de Bordeaux*, June 18, 1879; *The New York Med. Record*, Sept. 6, 1879.)

Treatment of Herpes Zoster.—In the treatment of this affection all remedies must be local. The chief attention must be paid to the epidermis, and care must be taken not to apply poultices or order baths during the acute stage of the attack, since applications of this kind would infallibly cause rupture of the vesicles. For a similar reason the patient should be cautioned against scratching himself. The treatment, therefore, which has lately been recommended of scrubbing the part with a couch-grass brush for the purpose of destroying the vesicles cannot be too strongly discountenanced. The local application recommended by Mr. Hardy consists of starch powder, 40 grams, mixed with 10 grams of zinc oxide. The affected spots should be freely powdered with this mixture, which may be fixed by means of a layer of oil or cucumber ointment, whilst the whole is covered with a thick layer of cotton-wool. The local applica-

tion relieves the pain, which, like neuralgia, should be treated with sulphate of quinine. When the pain is so great as to prevent sleep, a pill, consisting of 0·025 gram of opium in conjunction with one or two grams of chloral may be given. Hypodermic injections of the hydrochlorate of morphia may also be made, and they should be repeated as long as may be necessary. This is found to be the best method of subduing the pain and giving sleep. In cases of pale or red ulcerations, recourse should be had, at this period of the disease, to poultices of rice-powder and strained potatoes. In gangrene, tonic treatment must be employed, and the part should be washed with carbolised water, with a solution of sodium chloride, or with camphorated alcohol, whilst wine and brandy are given internally. At the Hospital of St. Louis, M. Vidal treats, or rather stops, herpes by applications of collodion, which cause the vesicles to abort during the first two or three days. On the fourth or fifth days from the first appearance of the vesicles the collodion should not be used, as the vesicles shrivel and ulcerate beneath the collodion. After the expiration of the first two days, the real treatment should be adopted, and M. Vidal then employs a paste of starch and balsam. (*Gaz. des Hôpitaux*, Sept. 16, 1879.)

Experimental Study on the Treatment of Hepatic Colic.—M. Laborde sums up the results which have been obtained from physiological experiments in regard to hepatic colic. (1) The excretory bile canals are endowed with a power of contraction; they are consequently able to contract spasmodically on the application of a stimulus, whether this be applied directly or indirectly. The contractility resembles that of unstriped muscular fibre, and the existence of such fibres in the walls of the canals is clearly shown by histology, and is in perfect harmony with the results obtained from experiment. (2) The mucous membrane of these channels is exceedingly sensitive, and this occasionally manifests itself under the influence of more or less intense stimuli, by painful symptoms, and by reflex phenomena, shown directly by spasms of the channels themselves. (3) The phenomena are particularly induced by the presence and contact of foreign bodies, such as biliary calculi whose spontaneous migration is thus rendered more difficult. These changes of place when they occur, are only accomplished after a longer or shorter period, and they possess the peculiarity that the foreign bodies are always carried towards and finally into the gall-bladder. (4) Anæsthetic and antispasmodic medicines are best adapted for the treatment of this morbid state, of which the mechanical conditions can readily be realised by experiment. (5) These remedies, more especially morphia, chloroform, and hydrate of

chloral, act by exercising at one and the same time an anæsthetic and paralysing influence, which produces a relaxation of the spasmodic contraction, a distribution of the spasmodic canals, and an accumulation of the bile which acts upon the foreign body by means of a *vis a tergo,* and forces it onwards towards the intestines. (6) The combination of morphia with hydrate of chloral or with chloroform, *i.e.* the simultaneous administration of these remedies, is the most effectual way of obtaining the required results, which are the insensibility of the biliary canals, the prevention of pain, and the favourable influence upon the migration and rapid extrusion of the extraneous substances. (*Gaz. des Hôpitaux*, Sept. 16, 1879.)

The Use of Aconite in Trigeminal Neuralgia.—Aconitia in cases of trigeminal neuralgia has been highly praised by Gübler, and has been recently studied by Dr. E. C. Seguin and others of New York, who have found it in a small number of severe intractable cases to be sometimes remarkably efficacious and sometimes valueless. In the successful cases the good effects persisted for long periods, at least after a comparatively short use of the drug. The formula used by Dr. Seguin is as follows:—

Duquesnel's Aconitia, gr. 1-12 or 1-8.
Alcohol.
Glycerin, āā ʒj.
Peppermint water, ad. f. ℥ij. M.
Dose one teaspoonful three times a day.

Duquesnel's preparation of aconite appears to be specially efficacious. The dose is to be carefully but steadily increased, until the full physiological action of the drug is felt; the first symptom is usually a feeling of numbness, especially over the face. (*The Boston Med. and Surg. Journ.*, Sept. 4 1879.)

The Treatment of Epilepsy.—Dr. McLane Hamilton is in favour of combining bromide of sodium with bromide of ammonium, equal parts of each, and of administering sixty grains of the combined salts together with thirty grains of hydrate of chloral daily. The doses should be divided so that the largest may be given a short time before the fit is likely to occur, if any regularity in the occurrence of the convulsions can be distinguished. If occasion require, the quantity may be increased. In other cases the bromides given in combination with bicarbonate of potash and some simple bitter tonic, as recommended by Brown-Séquard, will produce wonderful results. These remedies are especially serviceable in the nocturnal forms of the disease, and they are also to be recommended in the treatment of attacks

of an irregular character. It is of the utmost importance to combine the bromides with cod-liver oil, or some other fat-making material, which improves the nutrition of the nervous substance. If the disease has appeared in a patient over twenty years of age, or when syphilis is a cause, a combined iodide and bromide treatment, or bichloride of mercury, may be employed. In this form of disease, as in nervous syphilis generally, the administration of the iodides should be pushed as far and as rapidly as can be done with safety. (*The Canada Lancet*, Sept. 1879.)

Demodex Folliculorum.—Neumann contributes the results of his study of this animal in dogs and swine. As is well known, it produces no visible effects upon the skin of man, although of very common occurrence. Upon those of animals, however, it produces various forms of disturbance, firm, yellowish globular elevations resembling miliary nodules, pustules, crusts, superficial ulcerations, cicatrices, and pigment deposits, with loss of hair. In a single follicle of the hog he has found one hundred to two hundred animals; also great numbers in the glands of the dog. (*Anz. d. Ges. d. Aertze in Wien*, No. 7, 1878; *The Boston Med. and Surg. Journ., June* 12, 1878.)

Albuminuria from Styrax Inunction.—Unna publishes the results of a methodical examination of the urine of 124 patients with scabies in the Hamburg hospital during their treatment. The treatment consists of the inunction of an ointment of styrax three times in thirty-six hours, the patient in the meanwhile remaining in bed wrapped in woollen blankets. The examination was made on the first and third mornings, and in nine of the cases a considerable quantity of albumin, which, however, rapidly disappeared, was discovered in the urine. This in Unna's opinion is to be accounted for by the absorption of the balsam into the circulation, and its consequent passage through the kidneys. (*Virchow's Archiv.*; *The Boston Med. and Surg. Journ.*, June 12, 1879.)

Notes and Queries.

Treatment of Ague.—We have received the following communication on this subject from Dr. F. P. Atkinson :—"I have lately had a most inveterate case of intermittent fever under my care, which had resisted very large doses of quinine before coming to me, and yet rapidly yielded to the following treatment :—

"Euonymin, two grains every night, followed by effervescing Carlsbad salts in the morning and a mixture consisting of

> "Acid. nitro-hydroch. dil. ♏xv.
> Træ eucalypti globuli, ʒss.
> Quinæ sulph. gr. ii.
> Sp. chloroformi, ♏xv.
> Aquæ ad ℥i.

three times daily."

Creosote Soap.—The disinfecting properties of creosote are nearly or quite as powerful as those of carbolic acid, and its smell is less disagreeable, to some persons at least. We have received from Mr. Fore, of Birkenhead, a specimen of soap containing creosote. Its smell is moderately strong and not unpleasant; it is pleasant to use, and a good detergent.

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*** Any of the foreign works may be procured on application to Messrs. Dulau of Soho Square, W.C.; Williams and Norgate, of Henrietta Street, Covent Garden, W.C.; or Ballière, of King William Street, Charing Cross.

Department of Public Health.

OBSERVATIONS ON ANIMAL VACCINATION, WITH REFERENCE TO CERTAIN RECENT DISCUSSIONS AND TO THE ATTITUDE OF THE GOVERNMENT ON THE SUBJECT.

BY EDWARD BALLARD, M.D., F.R.C.P.,

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THE grounds on which the demand for the introduction of heifer vaccination into the system of public vaccination of the country has been based are: first, the assertion that the protection afforded by vaccination with humanised lymph has lessened in consequence of the deterioration of the vaccine by prolonged human transmission. This was an argument made use of by Dr. Cameron, M.P., in a letter that appeared in the *Times* newspaper. Had Dr. Cameron contented himself merely with saying, that this was an opinion held by some distinguished observers, I should not disagree with him. But Dr. Cameron gave his own reasons for this belief, and those reasons deserve some consideration. One of his reasons is the high mortality that attended the last severe epidemic of small-pox. No doubt it was exceptionally high, but the cause of this was well known among epidemiologists. The epidemic which spread in this country in 1871-2 ravaged the whole of Europe, and everywhere presented a similar virulence; and its ferocious charactier was admittedly explicable from its mode of origin. It took its origin in Brittany among a population exceptionally ill-protected by vaccination, and, being then subjected to no modifying influence, it acquired a ferocity of nature which it carried with it to

all the countries it invaded subsequently. This outbreak would probably not have been heard of beyond the isolated locality of its origin had it not been for the events of the Franco-German war. But at the time of the outbreak the circumstances of the French army made it necessary to drain the locality referred to of its youth. These brought the disease with them into the ranks of the army; the vaccination or re-vaccination of conscripts practised in ordinary times was, from the exigencies of the war, then neglected; the malady spread widely among the troops, and by them was disseminated among the populations wherever they went. Some carried this ferocious small-pox into Germany, and refugees from Paris brought it into England. At the period of introduction here, the metropolis was at the beginning of an ordinary epidemic outbreak of small-pox depending upon the accumulation of unvaccinated children. But after the introduction of the malignant malady from France the unusual phenomenon was witnessed of the grave disease supplanting the less grave form and finally reigning supreme.

The mortality statistics of this country, fairly dealt with, furnish no evidence that the protection afforded by vaccination with humanised lymph is fading. The first Vaccination Act was passed in 1840, and vaccination was made compulsory in 1853. In 1867 this Act was amended, and an organisation for its execution set on foot, which organisation was brought to its present condition of perfection in 1871. Looking to the small-pox death-rate during the period in which mortality has been registered, we see a progressive diminution of the small-pox death-rate, the only check to which occurred during the exceptionally ferocious epidemic of 1871–2. During the five years 1838–42 the mean annual death-rate per million of the population from small-pox was 571; during the three years 1847–9 (the causes of death from 1843 to 1846 were not abstracted at the General Register Office), it was 303; during the five years 1850–4 it was 274; during the five years 1855–9 it was 198; during the five years 1860–4 it was 190; during the five years 1865–9 it was 145; during the five years 1870–4 (which included the virulent epidemic already mentioned) it rose to 445—a number actually smaller than was observed during 1838–42; and during the four years 1875–8 it fell lower than ever, namely to 97.

notwithstanding a recrudescence of small-pox in 1877. (See Table appended.) Omitting epidemic seasons (during which children whose vaccination had been neglected necessarily fell victims to small-pox in exceptionally large numbers), the death-rate had been lessening among children under five years of age, which would scarcely have been the case if the protective character of their vaccination had been gradually lessening. Arguing thus from non-epidemic seasons alone, it may be stated that whereas between the years 1853 (when the first compulsory Vaccination Act was passed) and 1856 the mean annual death-rate per million under five years of age was 653, it fell between 1860 and 1870 to 419, and since the severe epidemic of 1871–2 it has further fallen (omitting the epidemic year of 1877) to 153. Even if the mortality of 1877 be included, the mean death-rate did not rise above 181. I admit that there were local deteriorations in the vaccine as cultivated by some vaccinators; but this arose from carelessness and neglect of the instructions under which they acted, and notably to the cultivation of the vaccine from pocks which were so hastened in their course as to present a considerable areola on the eighth day, and even some areola on the seventh day. The protection afforded by such vaccination could not be regarded as so good as that afforded by a vaccine which ran through its course more deliberately. And I feel bound to mention another source of defective protection. The Government gave rewards to public vaccinators whose work was such as to reach a certain high standard of excellence. Now in my experience I have found in many places, where among an ignorant labouring population the public vaccinator vaccinated so as to reach this high standard, that there existed medical men who would not hesitate to seek favour with the mothers by vaccinating their children by a single insertion, assuring them that one pock afforded full protection against small-pox, and that the practice of the public vaccinator was inflicting an unnecessary amount of punishment upon the children. The production of a single pock is capable of being registered as a successful vaccination. I cry shame on such men, since they must be believed to know—as every tyro knows—the remarkable results of the late Mr. Marson's inquiry, years ago, with relation to this subject.

Dr. Cameron's remarks in the letter referred to upon the nature of the lymph which several years ago was distributed by Mr. Ceely and Mr. Badcock, and which was largely used and cultivated in the vaccination of children in all parts of the country, require brief notice. It was lymph originally obtained by the variolation of cows. I contend that it was not a spurious article, such as Dr. Cameron declared it to be, but that the pocks which furnished it were pocks of the true vaccine disease, in producing which the gentlemen mentioned had succeeded, notwithstanding that M. Chauveau and other experimenters had subsequently failed.

The second ground on which heifer vaccination was based was the liability there is to the imparting of syphilis in the performance of arm-to-arm vaccination. I do not dispute that such a thing might happen—no one could do that in the face of facts within the cognizance of the profession—but hold that the danger is infinitesimal. During my experience of several years as an Inspector of Public Vaccination, I have never seen or heard of such a thing as occurring; the only occurrence of the kind that I have seen was that which Mr. Hutchinson brought to the knowledge of the profession several years ago. Another ground of the demand was that the use of heifer lymph would remove the scruples of parents, and so promote the completeness of the vaccination of the country. I contend, in opposition to this argument, that objection to arm-to-arm vaccination had practically little to do with the incompleteness of infant vaccination. According to the last return only 4½ per cent. out of the infants born are unaccounted for as respects their vaccination, and I can from my experience state absolutely that this deficiency arose from altogether a different class of causes. It was the result of sheer carelessness or negligence. When the period for public vaccination came round, the mothers found it inconvenient to attend at the station: either it was washing day, or they had at the appointed hour to prepare the husband's dinner, or there was some other equally trivial excuse on which the attendance was put off from time to time, until a removal from the district put the children beyond the jurisdiction of the local officer.

Quitting this part of the subject, I would offer some observa-

tions on the position of the Government in this matter. They have no shortcomings to confess with relation to vaccination. So far from that, I claim for the Department of the Government which is charged with the control of vaccination, not only public gratitude for the past, gratitude for what it has done and also for what it has not done with reference to this question of heifer vaccination, but also the full confidence of the public for the future. It holds constantly in mind in its arrangements with respect to vaccination the attainment of three objects, namely, completeness, efficiency, and safety; and I maintain that these objects have been practically attained. Possibly many may not be aware of the fact that the public vaccinators were provided with definite instructions as to the mode in which they were required to do their work, and I must say, for my own part, that I do not know how these could be improved upon. They were instructions, the observance of which, being essential to efficiency and safety, is actually enforced. Public vaccinators who obstinately neglect their observance are removed from their posts. Neither, while thus striving yearly to improve the national system of vaccination, has the Local Government Board been blind to the progress of events with respect to the practice of animal vaccination, or been negligent in its endeavour to ascertain the bearing of those events upon the needs of this country. The Board has been cognisant of the fact that animal lymph has from time to time been had recourse to by public vaccinators for the renovation of their supplies, and that when Dr. Blanc was vaccinating from calves in London, some years ago, Dr. Marson, then the chief vaccinator of the National Vaccine Establishment, renewed his stock at Surrey Chapel from one of Dr. Blanc's calves, and that this is the stock which has been cultivated there ever since. I recently saw a letter announcing that a public vaccinator in Wales had renewed his supply from a case of natural cow-pox, and on several occasions I myself have recommended public vaccinators, whose results were not to my satisfaction, to apply to Dr. Greene or to M. Warlomont for heifer lymph in order to start themselves afresh; and on no occasion has the Board given any indication of disapproval. The position the Local Government Board has occupied has been one of patient waiting and of

inquiry. As long ago as 1869 Dr. Seaton, acting under the Board's instructions, investigated the practice of animal vaccination as it was then pursued on the Continent, and he reported in a sense unfavourable to its adoption into the public system here. The facts on which his opinion was based at that time are admitted to be correct. Last year (1878) he again visited the Continent with the same object, and the facts which he then succeeded in ascertaining, although they showed that improvements in the practice had taken place, yet were not such as to satisfy the Local Government Board that vaccination with heifer lymph was at all comparable with vaccination with humanised lymph in the certainty with which a complete and defined result was producible by its use. And this was one of the first things to be satisfied about. On this occasion he visited Amsterdam, the Hague, Rotterdam, and Berlin, at the first of which places vaccination from the calf is performed by 10 punctures and at the last by 6 insertions. Measuring success by the proportion of vaccinated children in whom all the insertions were successful, or in whom they all failed, he found the results of vaccination with fresh calf lymph to be as follows: —(*a*) Complete success of all insertions in children vaccinated: at Amsterdam and the Hague 34 per cent., at Rotterdam 54, and at Berlin 21. (*b*) Complete failure of all insertions, in children vaccinated: at Amsterdam and the Hague 2·2 per cent., at Rotterdam not stated; at Berlin 7·1. (*c*) Insertion success (calculated), that is to say, the number of vesicles produced per 1,000 insertions: at Amsterdam and the Hague 700 or less, at Rotterdam not stated, at Berlin 678. With respect to the last-mentioned results, it is important to observe the close correspondence of the figures, in vaccination performed with this kind of lymph by equally experienced vaccinators, indicating that the results were not accidental merely. Compare with these results those obtained by Dr. Cory, the chief vaccinator of the National Vaccine Establishment, vaccinating with humanised lymph at Surrey Chapel. They are those obtained in the vaccination of the last thousand children vaccinated there with fresh lymph from the arm and leg, five scarifications; the results were registered by an observer who was not the vaccinator himself. (*a*) Complete success of all

insertions, 97·8 of all the children vaccinated. (*b*) Complete failure of all insertions, 0·0. (*c*) Insertion success, *i.e.* number of vesicles produced per thousand insertions, 978. And it is again to be observed that the operators in each instance were among the best and most experienced operators in the one case with animal and in the other case with humanised lymph; the results were the best producible then in each instance. Can it be wondered at that, with these figures before them, the Board should hesitate before adopting animal vaccination as part of the public vaccination arrangements in this country? The Board is invested with a serious responsibility, and, before it can move in the direction in which some desire that it should move, it must be satisfied that the use of heifer lymph would not compromise the completeness, efficiency, and safety which now characterise the vaccination arrangements which have been established. The Board has inquired, and has repeated its inquiries, and it is at the present moment prosecuting the inquiry, having charged Dr. Klein with an investigation into the affinities of small-pox and cow-pox, an important preliminary to any change in the face of the discrepancy of results obtained by our native and by Continental experimenters in the variolation of the cow. The Government is actively seeking information; and when the scientific question shall have been satisfactorily solved, various administrative difficulties will have to be considered. But the Bill which Dr. Cameron proposes to introduce into Parliament is intended to force the Local Government Board into immediate adoption of animal vaccination, to force it to act prematurely and before it is prepared to act. I am authorised distinctly to say that the Board regards the optional clause of Dr. Cameron's Bill, the clause which proposes to give parents the option of human or animal lymph for use in vaccination of their children at public stations, as quite inapplicable to the circumstance of our population at large; at the same time the Board has no objection to raise to any person who wishes for vaccination from the animal obtaining it from a private practitioner. Animal lymph is readily obtainable, being an object of sale in London. The Local Government Board desires earnestly to do the best they can for the protection of the public against the scourge of small-pox; and if the inquiries

of the Board should show in the end that animal vaccination is the best thing, that administrative difficulties which now appear serious can be cleared away, and that by its adoption into our national system greater completeness with greater efficiency and safety can be ensured, then it may be taken as certain that what the Board is satisfied will be most conducive to the public welfare is the thing which will be done.

I would add some remarks regarding the late Medical Officer of the Local Government Board, Dr. Seaton, who has virtually been charged with bigotry in his relation to this question. Dr. Seaton was a man of thorough honesty of purpose and honesty in research. But he was loaded, as the medical adviser of the Board, with serious responsibilities, and he was bound to exercise caution, especially following as he did Mr. Simon, whose administrative caution was exemplary. It was when Mr. Simon was the chief of the Medical Department that Dr. Seaton made his first inquiries on the Continent. When Dr. Seaton himself became the Medical Officer of the Board, he spontaneously undertook a second inquiry himself; it was he who initiated Dr. Klein's investigations; and, had it not been for the unfortunate circumstance of his ill-health, there could not be a doubt that more would have been done than has been done during the last three years in the prosecution of the inquiries which interested him so much. (See Table, p. 148.)

England and Wales.

SMALL-POX MORTALITY.

Year.	Deaths from all causes.	Deaths from Small-pox.	Death-rate from Small-pox to 1,000,000 living.	
1838	342,760	16,268	1,064	
1839	338,984	9,131	589	
1840	359,687	10,434	663	571
1841	343,847	6,368	400	
1842	349,519	2,715	168	
1843	346,445	Causes of death in England and Wales during the four years 1843-46 have not been abstracted.		
1844	356,933			
1845	349,366			
1846	390,315			
1847	423,304	4,227	246	
1848	399,833	6,903	398	303
1849	440,839	4,644	264	
1850	368,995	4,665	263	
1851	395,396	6,997	396	
1852	407,135	7,320	409	
				274
Compulsory Vaccination—				
1853	421,097	3,151	174	
1854	437,905	2,808	153	
1855	425,703	2,525	136	
1856	390,506	2,277	121	
1857	419,815	3,936	206	198
1858	449,656	6,460	335	
1859	440,781	3,848	197	
1860	422,721	2,749	140	
1861	435,114	1,320	66	
1862	436,566	1,628	81	190
1863	473,837	5,964	293	
1864	495,531	7,684	373	
1865	490,909	6,411	309	
1866	500,689	3,029	144	
V. A. Amended—				145
1867	471,073	2,513	118	
1868	480,622	2,052	96	
1869	494,828	1,565	72	
1870	515,329	2,620	118	
Arrangement Perfected—				
1871	514,879	23,126	1,024	445
1872	492,265	19,094	833	
1873	492,520	2,364	102	
1874	526,632	2,162	92	
1875	546,453	950	40	
1876	510,315	2,408	100	
1877	500,496	4,278	175	97
1878	539,872	1,856	75	

The annual rate of mortality in England and Wales from small-pox averaged 420 per 1,000,000 living in the twelve years 1838-42, and 1847-53.

The annual rate of mortality from small-pox in England and Wales averaged 216 per 1,000,000 living, during the twenty-five years 1854-78.

Memo.—In the first three quarters of 1879 only 486 deaths from small-pox were registered in England and Wales, of which 443 occurred in London, and in its outer ring of suburban districts.

ON A SUDDEN OUTBREAK OF SCARLATINA SUPPOSED TO BE CAUSED BY INFECTED MILK.[1]

BY HUBERT AIRY, M.D.,

One of the Medical Inspectors of the Local Government Board.

THE main outline of the facts of this epidemic is as follows:— In the last week of July there were, among adults resident in Fallowfield, a village three miles from Manchester, two or three attacks of illness (premonitory, so to speak, of the outbreak which followed) marked especially by vomiting and diarrhœa, and in one case by sore throat, but not developing the characteristics of scarlatina.[2] On July 31 there occurred, in a child in one of the same families, a decided case of scarlet fever, which, however, could not be suspected of giving rise to any of the subsequent cases. On Sunday, August 3, two children of one family, living in Carill Drive, and four children of another family living in Wilbraham (or Prince's) Road, were taken ill with symptoms which soon declared themselves to be those of scarlet fever, accompanied with vomiting and diarrhœa. In the course of Sunday night, August 3, and Monday, August 4, 18 persons in 11 other families, belonging to or having relation with, though some of them absent from, Fallowfield, sickened in the same way. Several of them had felt their throats sore on the Sunday evening. On Tuesday, August 5, two other cases occurred in two families previously attacked. On Wednesday, August 6, another family had a slight case of sore throat, which might have been passed over had not two other members of the same family subsequently sickened with scarlet fever, apparently caught from the first by direct contagion, on August 9 and 14. There was also a doubtful case on August 7, and another on August 13.

[1] Abstracted from an official report on the subject recently issued by the Local Government Board.

[2] It need hardly be said that the names "scarlatina" and "scarlet fever" are used indifferently in this report.

Thus, including nine cases of somewhat doubtful or undeveloped character, such as are not unfrequently met with in connection with epidemics of scarlet fever, there were in all 35 persons in 18 families attacked within a period of one month; and of these 35 no fewer than 24 were attacked within a space of 36 hours, between Sunday morning August 3, and Monday evening August 4.

The symptoms which accompanied the onset of the disease were in many cases so remarkable as to lead the medical men who attended them to believe that there must be something exceptional in the cause or mode of infection. Not only was there frequent vomiting, but also severe and continued diarrhœa; indeed, in some of the persons attacked diarrhœa was the most prominent and almost the only symptom; and in one of the earliest cases which occurred in an adult and did not show full febrile development, it was remarked that the symptoms were more those of irritant poisoning than of scarlet fever. There was, however, no doubt at all as to the real nature of the disease in other cases which, with similar symptoms of irritation of the alimentary canal, presented also all the characteristics of scarlet fever. Among the medical men who were in attendance on these cases a decided opinion prevailed that in all probability the morbific matter had entered the system through the alimentary canal. The outburst of 24 cases of scarlet fever within 36 hours pointed to some one common source and act of infection. At once suspicion fell upon the milk; and on inquiry it was found that every family that was attacked had received its supply of milk from one and the same dairy, while neighbouring families, taking milk from other dairies, had entirely escaped.

It was further found that one of the milkers employed at this dairy lodged at a house where a boy lay in the peeling stage of scarlet fever; and it was concluded that he had in some way conveyed the contagium of the disease to the milk.

Keeping these conclusions regarding milk (to which I shall afterwards return) as much as possible in the background, my inquiries were directed in the first place to the examination of other possible or conceivable modes of fever dissemination.

The village of Fallowfield is situated on low clayey land

about half-way between the rivers Medlock and Mersey. The centre of the village is occupied by a small but dense mass of dwellings of the poorer class, arranged in short streets, behind a row of shops which front the main road. Around this nucleus in almost every direction villa residences have been built, which are tenanted mostly by gentlemen having daily business in Manchester.

With only three exceptions, the families attacked with scarlet fever belonged to the better class, residing for the most part in detached villas, separated by large gardens from their neighbours. The cases were widely distributed in the village about the northern part more than the southern, and especially about Wilbraham (or Prince's) Road on the west side of the main road, and Oak Drive, Carill Drive, and Ladybarn Road on the east. In these roads inquiry was made, not only at the houses where fever had been present, but also at those which remained free.

It was satisfactorily ascertained that the persons who were attacked with scarlet fever had not assembled together at any neighbourly gathering, garden party, or public entertainment within the widest possible limits of incubation of the disease. Indeed there had been no general assemblage of any such kind since Whitsuntide, the first week in June. Between two of the families communication was frequent; between certain other families (not all), occasional. With these exceptions, intercourse between any two of the various families concerned had been exceedingly rare, if there had been any at all.

If all the persons attacked had been found to have attended the same place of worship on Sunday, July 27th, there might have been ground for suspicion that the infection had been contracted there from some previously infected member of the congregation. But there had been no such community of attendance.

If these 18 families had employed the same laundress, it might have been suspected that scarlet fever had been spread with the clothes from the wash. But it appeared that only two families out of the 18 had dealings with the same laundry, and in several of them the washing (especially of the children's clothes) was done at home.

There was no scarlet fever in the house of the postman who distributed letters in Fallowfield; nor in that of the newsagent who supplied most of the residents with daily newspapers.

There is no community of drainage between different parts of the district.

Water is supplied to the district not from a local source but from the Manchester Waterworks.

The prevailing wind for the last week in July and the first few days in August had been south-west, and in that direction there are several offensive ditches carrying sewage, but this influence, though unwholesome, is not known to be capable of causing scarlet fever.

But one and all of the above-suggested conceivable modes of conveyance of the fever disappear before the simple question, Why did the fever attack only customers of one particular dairy, when their neighbours, who were customers of other dairies, escaped? Exceptional incidence on families served from one dairy is, I need hardly say, not sufficient in itself to prove that the incident disease is spread from that dairy. If every family in a certain locality took milk from one dairy, it might easily happen that scarlet fever, due to some other local cause, might break out in that locality among families all taking the same milk; yet in that case the milk would not be the cause of the outbreak. But here, at Fallowfield, there are several different dairies, all having customers in the same localities. For instance, in Wilbraham Road, the suspected dairy (which I will call Δ) had the custom of five families; while 22 other families in the same road were served from other dairies. In Oak Drive six families were served from Δ, and five from other dairies. In Carill Drive, two families from Δ, and two from other dairies. In Ladybarn Road, three from Δ, and six from others. But scarlatina attacked only families served from Δ. It is quite impossible that any local cause unconnected with the milk-supply could have operated with such unerring selection upon the customers of one dairy, when so many who were supplied from other dairies were in all other respects exposed to the same local conditions. The conclusion is irresistible that the contagium of scarlet fever was spread *with* the milk from the dairy

Δ ;—we must not say *in* the milk until we have described the mode of milk distribution.

The families supplied from Δ were between 60 and 70, scattered over the whole village. With few exceptions they were families of the better class. Many of them were away from home at the time of the outbreak; others were on the point of leaving, and the date of departure in some cases will prove to be of critical value in determining the probable date of infection. The whole village admits of division into two nearly equal groups, one to the north and the other to the south of Ladybarn Road; and it is to be observed that the number of infected families in the southern group was only two, while in the northern group it was sixteen, including doubtful cases. I shall be able to show that the milk-supply to these two groups was not exactly the same.

I may say at once that there was not the slightest reason for suspecting any wilful dilution of the milk or want of cleanliness in the vessels of the suspected dairy. The business was perfectly honest, and there was general testimony to the richness of the milk. The cans were washed out with water laid on to the dairy from the Manchester Waterworks. In this respect this dairy was superior to some others in the district. The cows were about twenty in number, and were, as far as was known, free from disease. The milkers were three in number: (1) the daughter of the farmer's widow who kept the dairy; (2) a young man who lodged in the farmhouse; (3) an old man who lodged at the house of his married son in Oak Street, in a crowded block in the centre of the village. Most of the milking was done by Nos. 1 and 2. There was no definite order of milking; each milker took one cow or another as it might happen, till all were milked. The produce of each cow was poured from the milking-can through a straining cloth into the gathering-can, special care being taken as regards the cleanness of the cloth, and from it when full into one of two delivery-cans which were taken round by cart. Thus the first half of the milking was poured into one delivery can, and the second half into the other. From the morning milking, two carts, each taking one delivery-can, were despatched on two separate rounds, one going to the right (northward), the other to the left (south-

ward), from the bottom of Ladybarn Road, one driven by milker No. 2, and the other by a nephew of milker No. 1, who himself was one of the persons attacked with scarlet fever on August 4th. From the afternoon milking at 3 P.M., only one cart was despatched, taking two delivery-cans for the whole round. At the bottom of Ladybarn Road an additional quantity of milk was poured into one or other of the two Δ cans from a can (δ) belonging to a small dairy at Cheadle Hulme, six miles away. It could not be said whether the northern or the southern can was most likely to receive this addition; but it must not be overlooked that this addition would almost necessarily make some difference in quality between the northern and southern supplies according as the δ milk might be more or less pure than that from Δ). After the can δ had been emptied, it was left standing on a flagstone by the roadside, and was picked up and taken back to Cheadle Hulme in time for the next milking there.

While the bulk of the customers were served by cart, those who resided near to the dairy Δ were served by hand, the old man (milker No. 3) carrying round their daily supply morning and evening. Thus there was a distinction, as regards the *personnel* of the milk service, between these near customers and the rest; and also (in the morning) between the north and south groups that were served by the two carts. Now if the fever had been spread by direct personal contagion from one of the milk servers to the customers whom he served, we should have expected to find that spread confined to one or another of the three groups above mentioned. But none of these groups were exempt from the scarlet fever, and we may therefore conclude that the spread of the fever was not due to personal contagion. It seems, however, almost superfluous to insist on this point, for it could not possibly happen that so many children of so many families should come in contact with the person, whoever he was, that carried the milk.

We are driven then to the conclusion that the scarlet fever infection was conveyed *in* the milk supplied from the dairy Δ.

Though none of the three groups above mentioned were exempt from scarlet fever, yet it deserves careful notice that

they were not all equally affected. The families that were personally supplied by milker No. 3 were 11 in number, including the farm Δ itself, and five of them were attacked with scarlet fever. Of the remaining six, three contained only servants, the families having left on or before July 20th, and in two the families consisted only of adults. In this group, out of six families that were probably susceptible of infection, five were attacked.

In the remainder of the north group, there were about 25 families supplied by the north cart in the morning. Of these, 10 were visited with scarlet fever. Of the remaining 15, four families had left, on July 9th, July 18th, July 19, and August 1st, leaving only servants in the house, who took but little milk, and were generally supplied with it in the evening: one family had discontinued taking the milk from Δ on July 29th; at least six families consisted only of adults. In this group, out of 14 susceptible families, 10 were attacked.

The south group numbered about 30 families, of which only two were certainly infected. Of the remainder I am not able to give a precise account; but many had left, and several consisted only of adults.

This disparity will need to be taken into account in any attempt at explaining the origin of the outbreak.

As to the probable date of inception of the fever poison, we have evidence of singular importance in a remarkable case which has only recently come to light, a month after the date of the outbreak. I owe the particulars of it to Professor A. Gamgee, M.D., of Owens College, who received them from the physician (Dr. Thorburn, of Manchester,) who attended the case. I give the account mainly in Dr. Thorburn's own words: On August 4th, a child, E. B., residing more than two miles from Fallowfield, was attacked with the scarlatinal rash and fever. There were smart premonitory symptoms on the evening of August 3rd. She had returned along with the rest of the family from an out-of-the-way country residence where scarlatina was untraceable, on August 1st. On Saturday, August 2nd, she with four others of the children was sent to the farm Δ, whence the family intended to get their regular supply, and had there

some milk to drink. She is more fond of milk than the others, and so it is probable that she had the largest quantity. This history, Dr. Thorburn remarks, taken in connection with the Fallowfield outbreak, "seems to establish an almost certainty that the child was infected by one drink of milk, that her brothers and sisters who tasted more sparingly at the time were unaffected, though one of them was very feverish for a few hours, and that the period of incubation can have been little over thirty-six hours. The last point is the most important. If any evidence could be obtained of a similar character about other of the Fallowfield cases it would tend to show that infection through the gastro-intestinal canal implies a very short incubation."

Confirmatory evidence of the kind desired is not wholly wanting. A nearly parallel case is found in the family K. Two boys, aged 14 and 16, returned from school at Wolverhampton, where there had been no recent scarlet fever, on Friday, August 1st. On Saturday and Sunday, August 2nd and 3rd, they were at Fallowfield, and drank milk from the dairy Δ. On Monday, August 4th, they left for Scotland, and both suffered from diarrhœa that night. On Tuesday the eldest boy had a rash. The fever was not fully developed in these cases, but they were very like some others in the same outbreak, and probably depended on the same cause.

Another case in which suspicion rested on one particular draught of milk occurred in the family C, where the lady of the house suffered from violent vomiting and diarrhœa in the night of August 2nd, having that evening taken some biscuit and a draught of milk for supper. The attack was so sudden and violent as to simulate irritant poisoning, and the biscuit at first came under suspicion; the milk was overlooked until the general outbreak of the next few days became known.

Moreover, there was an instance of a family of three children aged 4 months, 16 months, and 4½ years, living in Wilbraham Road and drinking milk from Δ without any special precaution up to the morning of Friday, August 1st (on which day they left home), yet escaping infection altogether.

A similar case occurred in Egerton Road, but this was in the

southern group of customers, among whom the fever incidence was rare.

It should be mentioned, however, that another family of five children, of ages from two to eight, in Wilbraham Road, escaped altogether, though they did not leave home during the epidemic, and continued to drink milk from Δ. The milk was not boiled. I was unable in this case to discover any circumstance that would account for the exception.

While these cases go to show that infection in the main did not take place before Saturday August 2nd, there are three cases in two families, H and N, which show that infection took place not later than about 2 P.M. on that day, for about that time these families left Fallowfield for distant parts of the country, and developed the symptoms of scarlet fever on Monday, August 4th.

These indications conspire to make it probable that the principal date of infection was the morning of Saturday August 2nd, the disease showing itself in eighteen cases on Monday August 4th, after an incubation of some 48 hours, and in six cases on the Sunday, perhaps, after only 24 or 36 hours incubation.

We have now to inquire how it could have happened that the milk from the dairy Δ, and especially that portion of it which was delivered to the northern group of customers, should become contaminated with the poison of scarlet fever.

There was no recognised disease among the cows; nor, if there had been, do we know anything as yet about the possibility of scarlatinal infection being derived from such a source. It would appear then that the contamination of the milk must have taken place either (1) in the act of, or after, milking at the dairy Δ, or (2) in the addition of the supplementary milk from Cheadle Hulme.

The latter alternative appeared at first sight full of promise, especially as it offered a probable explanation of the disparity of fever incidence on the north and south groups of customers; for it was sure to happen that this contingent from Cheadle Hulme should be added unequally to the north and south cans, and probably it would all be added to one of them. But on closer inquiry I gathered that the milk which was supplied to the nearest customers, and which was at least as infective as that which was supplied to the rest of the north group, did not

contain any of the Cheadle Hulme milk, but was entirely the produce of the home dairy Δ. This fact is sufficient to clear the Cheadle Hulme milk from suspicion, and to bring the inquiry to a point on the dairy Δ. [Dr. Airey visited this dairy, but found there nothing but what tended to confirm the conclusion just stated.]

Returning to the milk produced at the dairy Δ, I have already stated that early in the outbreak investigation by two or three medical men in the neighbourhood, who were particularly interested in the matter, brought to light the fact that while at the farm Δ itself there was no scarlet fever prior to August 4th, and both milkers (Nos. 1 and 2) were free from any evident risk of contamination, the third milker, an old man named Hill, was lodging at a house where his grandchild was lying in the full height of desquamation after scarlet fever. The child lay in the backroom on the ground floor. The grandfather did not return to the house for his meals, but only to sleep. He always entered at the back door (the front entrance was practically unused), and it was not necessary for him to come in contact with the sick child, as the foot of the stair leading up to the room where he and his son slept together gave immediately upon the back door.

Having regard to the confined space, imperfect ventilation, low standard of cleanliness, and want of sanitary intelligence, it is difficult to believe that the old man Hill could come from that house without carrying about him the taint of scarlatinal infection. It is not at all impossible that he may have carried in his pocket a handkerchief, seldom changed, which had been in contact with, perhaps moistened by the mucus of, the sick child; and at any time his hand may have become accidentally charged with the scarlatinal contagium. What if some such accident happened on the morning of August 2nd, just before Hill took his share of the milking? Might not the taint have passed from his hand to the milk in the very act of milking?—or possibly from his clothing as he grasped the milking can between his knees? There are evidently many possibilities of contamination under such conditions. The old man himself, I should say, vehemently denied that he had been near the child.

How then on the theory that the milk was thus infected by one of the milkers at the dairy Δ, could it happen that there should be so great a disparity in the incidence of scarlet fever on the two groups of customers, north and south? It is plain that if the whole milking were all mixed together in one can, and the different customers were all served in the same way and under the same conditions, there would be no great inequality between the results in two groups each containing so many individuals. But where there are two cans there is at once the possibility of a difference (original or acquired) in their contents. And when one can is filled before the other, they not only receive the yield of different cows, but they must also receive in different degree the taint (if any) of the milkers' hands. It is indeed impossible that the contents of the two cans should be absolutely similar, though they may be equally wholesome or unwholesome. But in all probability they will be unequally so. In the case before us this inequality would in all probability be still further increased by the unequal addition of the Cheadle Hulme milk. It is, then, quite reasonable to suppose that on the morning of Saturday, August 2nd, the two cans of milk which diverged at the bottom of Ladybarn Road were unequally infective, that the one which took a northerly direction was more strongly charged with the infection of scarlet fever than the one which went to the south. This supposition would account for the unequal incidence of the fever on the north and south groups. It must be confessed, however, that there is no positive evidence that the first part of the milking was delivered to the northern, and the last part to the southern group. By the time the inquiry had reached this stage, it became difficult to obtain information.

This, then, to sum up, is the theory which appears to offer the most probable explanation of all the facts of this remarkable outbreak; that the milkman, Hill, did in some way convey the infection of scarlet fever from his sick grandchild at home to the milk with which he was concerned at the dairy Δ; that while probably on one or two previous days the milk had been contaminated in a less degree, on one special occasion it was especially contaminated; that the contents of the milk-can from

which the northern group of customers were supplied were on that occasion contaminated in a higher degree than the contents of the other can from which the southern group were served, and that thus there was more general spread of fever among the former than among the latter; that this special contamination probably took place at the morning milking on Saturday, August 2nd; and that the period of incubation in the majority of cases was about 48 hours.

I must return to the case of the boy Hill in Oak Street, to which the whole outbreak appears to be traceable. This was the only case of scarlet fever known to exist in Fallowfield in the latter part of July. The boy was taken ill, as I learn from Mr. Smith of Fallowfield, who attended the case, at the beginning of July. There was no doubt that he had caught the disease from the child of a neighbour three doors off in the same street, who was ill with scarlet fever, for there had been frequent personal intercourse between the two families, and little if any attempt at isolation. There had been other cases of scarlet fever here in June; and shortly before there had been a great deal of scarlet fever not far from Fallowfield.

In the adjoining Ardwick district there were 37 deaths from scarlet fever in the fourth quarter of 1878, 12 in the first quarter of 1879, and eight in the second quarter. Of these eight deaths in the second quarter, five occurred in Rusholme, nearly a mile to the north of Fallowfield, on the same main road. Another death took place in Rusholme on August 23rd.

After or during such a prevalence of scarlet fever in the adjoining neighbourhood it is easy to understand how the disease might be brought into the frequented locality about Oak Street, and once there it would be likely to spread from one house to another for want of proper isolation.

THE PRACTITIONER.

MARCH, 1880.

Original Communications.

ON ATMOSPHERIC AND CLIMATIC INFLUENCE IN THE CAUSATION AND CURE OF PULMONARY DISEASES.[1]

BY JOHN C. THOROWGOOD, M.D., F.R.C.P.,

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THAT severe and prolonged cold is a powerful cause of increased prevalence of inflammatory affections of the air passages and lungs is a point pretty well proved and acknowledged. On referring to the Annual Summary of the Registrar-General for 1878, page 21, I observe that during the year 1868 the mean temperature in London was 51·6°, and the deaths from diseases of the respiratory organs numbered 12,182. In 1869, the mean temperature being 49·5°, the deaths from respiratory diseases were 14,121. In 1873, mean temperature 48·9°, deaths from respiratory diseases, 16,912.

Deaths in London from tubercular diseases during these same three years are recorded as 12,099, 11,915, 11,712.

Those of us who watch the weekly returns of the Registrar-General will not fail to have noticed how soon the effect of a

[1] Read before the West Kent Medico-Chirurgical Society.

week or two of cold weather is seen in the increased death-rate from such complaints as laryngitis, bronchitis, pneumonia, and pleurisy. That severe cold can greatly intensify the severity of pulmonary inflammations is shown by Dr. Hjaltelin's account of the pneumonia which was so prevalent and fatal in Iceland during the year 1863. During sixteen years spent in various foreign countries, Hjaltelin never saw any pulmonary inflammation so acute and so rapidly fatal as that which he was called upon to treat in his own native home of Iceland.

In the present day we hear a good deal said of inflammation as being the great destroying agent in pulmonary phthisis or consumption of the lungs. This statement, first put forth by that careful observer the late Dr. Addison of Guy's Hospital, finds exception in the fact that it is not in the cold countries, where inflammatory affections of the lungs are common, that we meet with most consumption. Dr. Schleisner says (*Lancet*, 1857), "there are countries where phthisis is unknown, as, for instance, Iceland," the very place where pneumonia, as we have just seen, is often rampant. In Finmark no phthisis is seen; and the Swedish physicians maintain that consumption becomes less common as we proceed northwards. Dr. Lombard, of Geneva, says he has never known a case of consumption among the monks of St. Bernard. In the civil population of Great Britain it is found that, in London, the deaths from phthisis are 18 per cent.; in Edinburgh, 11·9; in Leith, 10·3; and in Aberdeen, 6·2. With regard to the prevalence of phthisis in hot countries, I get, from information published by Dr. Pollock, the facts that in the West Indies consumption is acute in form and rapid in progress. In Italy it is a malady of universal prevalence and great intensity, and the Italians regard consumption as a contagious and malignant disease. Without adducing further evidence of the prevalence of consumption in warm climates, and its comparative rarity in those that are cold, I will proceed to consider certain forms of phthisis.

First, we have knowledge enough already acquired to enable us to differentiate phthisis, or consumption, of the lungs into two large groups, and hospital experience appears to me clearly to bear out this distinction. We may recognise as group 1, cases of consumption originating in catarrh and cold, or in some

inflammatory attack in the chest produced by cold. This is the kind of consumption prevalent in raw cold climates, common enough in England and furnishing a large contingent of hospital cases.

Inflammatory action is a very active agent in this form of phthisis, but the disease may run a chronic course; its tendency, under judicious treatment, being oftentimes to more or less fibrosis of lung and arrest of active symptoms.

Patients affected with this catarrhal phthisis derive benefit from going to a mild climate, such as Ventnor or South Devon; and, after what I have just stated, I see nothing paradoxical in Dr. Walshe's words in the last edition of his work on the lungs, page 687: "While Southern Devonia is a favourable resort in certain cases for phthisical Londoners, it seems a very hot-bed of the disease for its own native population." I also understand how it comes about that Mr. A. extols the climate of Davos Platz as having saved his son's life, while Lady B., who went to Davos with a consumptive daughter, cannot bear to hear the name of the place mentioned.

Group No. 2 comprises that form of disease known as true tubercular consumption. To use the words of Dr. Clifford Allbutt, "the despair of the physician and the terror of the public." This form of consumption comes on insidiously, often from no cold-caught, from no privation of food, but simply from some inherent, often hereditary, vice in the system. It is a febrile disease, having much the character of rapid blood-poisoning, it attacks other organs besides the lungs, and lasts only a few months, sometimes only a few weeks. Boudin has described it in its intensity as it prevails in the littoral of Peru and in the West India Islands. According to M. Comeiras, it carries off one-third of the population of Tahiti, prevailing more among women than among men: just the reverse is seen in this country among our cases of catarrhal phthisis. Dr. C. T. Williams was informed by Mr. Busk of the *Dreadnought* that he made a number of post-mortem examinations on South Sea Islanders who had been attacked with acute tuberculosis on their voyage to London, and in whom the disease proved rapidly fatal.

As a practical inference from the foregoing statements, are we to send all persons who are in no matter what stage of consump-

tion to the coldest place we can find, and expect a wonderful cure to result? By no means. Where the chief agent for mischief that is to be combated is of an inflammatory nature, a mild soothing air is best. Where cough is severe and bronchial spasm frequent, a mild air also is suitable. For a patient recovering from a recent pleurisy or pneumonia, also, I hold that a mild air is eminently beneficial. That cases of catarrhal phthisis arising from cold caught improve wonderfully at Hastings, Ventnor, and Bournemouth, is a matter with most of us of no rare experience. The advantage of such a climate is this. The patient can pass much time out of doors with safety, and can sit with open windows without risk of incurring another attack of bronchitis or pneumonia from the exposure.

Suppose, for the sake of experiment, we wished to make a bronchitis run into a true phthisis, then one way might be to expose the patient freely to cold air while in the weakness of convalescence; but a tolerably prolonged observation among dispensary and hospital patients would make me name, as the most certain way of setting consumption of lungs going, to confine the patient closely to one room, and let him breathe over and over again the same atmosphere, while silence is temporarily imposed on the incessant cough by frequent doses of opium. In this way I am in the habit of saying that consumption may be cultivated and developed out of group 1 into the more serious form described in group 2, so that it becomes a fearfully destructive malady.

I expect one reason why the Italians speak of phthisis as a contagious disease of great malignity, is that they shut up their consumptive patients within doors slowly to smother in their own exhalations. The tendency of confinement in a close atmosphere to cause blood-spitting and consumption has been convincingly demonstrated by the statistics obtained by Dr. Guy when engaged in investigating the effects of certain trades on the health of those employed.

To enter upon the pathological change that takes place in the cell-wall of the lung when bronchial irritation is passing into phthisis, and to go into the way in which a growth of miliary tubercle may be set up in the adenoid tissue of the lung, would be foreign to the purpose of this paper. I would throw

out the suggestion that under unfavourable influences of the in-breathed air, coupled with some vice, hereditary or not, in the system, the original inflammatory action takes on some peculiar type, call it strumous, tubercular, septic, or what you like, and that then the case of the patient becomes very perilous and the plan of treatment suitable in the original inflammatory origin of the disease no longer avails; and, if pursued, may indeed be absolutely mischievous.

A few facts will serve to make plain my meaning. A young man of a delicate family comes from the pure air of Westmoreland to live in London and work all day in a warm confined warehouse. He soon gets a cough and comes to Victoria Park Hospital, because the medicines that have been given for the cough have failed to afford any relief. At the upper part of one lung a very few crepitant sounds are heard with inspiration. The young man goes away for three months to his native air and returns to London apparently cured, no morbid sign to be found anywhere. He resumes his work in the warehouse, and in twelve months I am called in to see him one day, and am shocked to find an extensive breaking down, and excavation of the lung. He again goes home to Westmoreland, but this time things are gone too far for a recovery, and before long he is dead.

In the cases of young children who are kept very close in heated rooms, and who are said to be always taking cold, we often see most obstinate cough and catarrh due to the throwing off from the air-passages of a weak poorly-nourished epithelium which in time may choke the air-cells, and so lead to pulmonary consumption. The cure consists in laying aside paregoric and squills while we feed the epithelium with a pure healthy air. Appetite soon returns, and the cough speedily takes to flight.

In removing lingering inflammation after an acute attack on the chest, I have seen excellent results come from a sojourn at Torquay, Ventnor, and similar mild warm health-resorts; but when the disorder has passed from the inflammatory stage to one that involves the general nutrition, and that is marked clinically by softening and breaking down of lung-tissue, with night sweats and copious purulent expectoration, I never saw any good come of a residence in a mild sedative climate.

Some years ago I attended a young lady in an advanced consumption; she lived in a small room in the Strand, and before very long was dead. Soon after, her sister came to me with cough and hæmoptysis, and under treatment these symptoms improved but slightly. The girl had an offer of going for a winter to Canada. I urged her strongly to go; and, notwithstanding some rather out-spoken warnings by friends as to the certain death that would ensue if she took her weak lungs to the cold air of Canada, she determined to go, and when there wrote home letters that described a degree of cold to which I should be very sorry to be subjected. Within a year she returned home, and for the last four years has had perfectly sound health in every respect.

One of the most remarkable contractions of a large pus-secreting cavity in the right lung that ever came under my notice, was in the case of a man who spent several months at Harrogate. It is now five years since he thus recovered, and he now enjoys very fair health, though rather short in the wind at times. In the case of a man whom I met years ago at Harrogate, I was interested to observe the wonderful benefit he seemed to derive from the bracing air. He told me he could eat well and was gaining flesh fast; whereas, during a previous sojourn under medical advice at Torquay, his symptoms progressed so fast that he felt sure a few weeks more at that place would have been his death.

I cannot from my experience give you one example of a patient well on in true consumption who has found benefit from a relaxing air like that of Torquay. Dr. Symes Thompson once told me of a patient of his who had got well apparently of consumption during a winter abroad, and in whom cough, expectoration, and other morbid symptoms all returned during a few months' sojourn at Torquay.

To cure a softening lung dryness of the air is essential. Whether a dry, cold, pure antiseptic air does really exercise its curative action by checking some septic process that is going on in the lung, or by annihilating certain morbific germs which engender tubercle is not yet proved; though for myself, I confess, the idea is attractive, for I cannot help thinking that germs may be given off in the expirations of people in advanced tubercular

consumption that may set up the disease in others who are vulnerable in their pulmonary epithelium, or, in other words, who have a predisposition to consumption.

A French observer, M. Bergeret, believes the expired air of tuberculous patients transports the tuberculous elements from lung to lung. If this be true, all the more need for the tuberculous patient to live in an atmosphere that is hostile to the propagation of morbific germs. A mild warm air hardly fulfils this indication, and practical experience proves it does not; while practical experience certainly shows that tubercular consumption may be arrested by a clear cold atmosphere at a high altitude.

Whether such arrest of disease be due to an antiseptic influence is a question I cannot venture to discuss. Just now we know that men's minds are full of ideas of germs, and their septic and baneful effects on the economy of man; and doubtless the septic element, if such there be, in pulmonary consumption, will not fail of obtaining a due proportion of regard from competent observers.

The fact that the pure air of high mountainous regions has a wonderfully restorative effect over diseased lungs has been well proved. The line of immunity from consumption has been fixed in Mexico, between twenty and thirty degrees north latitude, at 7000 feet, and the Mexican Indians of this region are remarkable for their wide chests, quite out of proportion to the size of their bodies. At Davos Platz and in the upper Engadine, 5,000 to 6,000 ft. above the sea-level, we are assured by the local physicians that among the natives consumption is quite unknown.

To illustrate the curative action of a high mountain climate, let me briefly give you the celebrated case of the Swiss clockmaker, mentioned by Dr. C. T. Williams in his Lettsomian Lectures. This man was twenty-seven years old, and both his parents had died of consumption. The disease in his own case was of non-catarrhal origin, but came on insidiously with blood-spitting, loss of flesh, and night-sweats. He left Switzerland and settled at Panama, a low-lying malarious place, and here he got rapidly worse, so he left Panama and went to Quito, in the Andes, 9,500 feet above the sea level.

Here he spent six months, lost his cough, and gained weight. A return to Panama brought back all his troubles, and, when examined after his third sojourn in Panama by Dr. Guilbert, he looked like a walking corpse, he had no appetite, constant diarrhœa, a fistula in his rectum, severe cough with profuse purulent expectoration, unmistakable large cavities in his lungs, and crepitation at the base of each lung. In this condition he left Panama for La Paz, the capital of Bolivia, 13,500 feet above the sea. There, some time later, Dr. Guilbert met him and found that the fever, night sweats, and diarrhœa had ceased, expectoration had diminished, and during some mountain excursions the patient was able to walk as well as the doctor. The pulmonary cavities remained unchanged. Unfortunately private business called the poor man back to Switzerland, where his disease made rapid progress, and he died at Eaux Bonnes.

Some think that the curative action of these mountain climates is due to the inspiration of the rarefied air producing some degree of emphysema of the lungs, a condition antagonistic to the development of tuberculosis. All observers agree that a notable widening of the circumference of the chest is a result of a prolonged sojourn at a high altitude, and is a common, indeed constant, phenomenon in those who have recovered from consumption in one of these exalted climates. The cures among consumptives are, according to Dr. Fuentes, in his statistics of Lima, 79·5 per cent.

To me it appears that among this class of cases of consumption there cannot be much inflammatory action at work as the destructive agent. We hear much of rest as a most important curative method in all manner of inflammations, and we read of resting the lung, when diseased, by encasing the chest in a lung-splint and good result ensuing. In this mountain cure of consumption we put increased expansive power on the lung cells, and we excite and stimulate the circulation with the effect of obtaining curative results unknown to any other method of treating confirmed pulmonary consumption.

NOTE.—It was interesting to find that, in the discussion that followed the reading of this paper, the author's views were

confirmed by cases brought forward by some of the speakers. The President of the Society, Mr. J. P. Purvis, mentioned three examples of complete cure of very decided pulmonary consumption, of non-catarrhal origin, from a change of air, in one case to Moscow, in two others to Canada. Dr. G. H. Cable also reported a case of catarrhal phthisis that recovered well after a prolonged sojourn at Ventnor, while another case did exceedingly well at Harrogate.

IS QUININE AN ECBOLIC?

BY RICHARD NEALE, M.D. LOND.,

Late of Batavia, Java.

In the *Practitioner*, for December, 1879, page 429, a case is brought forward to support the view that quinine is an ecbolic.

An intimate acquaintance with malarial fever in Java, extending from 1857 to 1865, attacking pregnant women of numerous races, has convinced me that this view is erroneous.

That such patients occasionally miscarry is true; that quinine in any way increased the tendency to such an accident I satisfied myself was not the fact; and in no case, since my return to England, in which I have given quinine in large doses to women during uterine gestation, and such cases have not been few in number, have I at any time had to regret its exhibition on account of miscarriage following.

Many dentists tell their patients that drugs have ruined their teeth, ignoring the fact that the disease for which drugs were given has been the real cause; so, quinine is often blamed when the fever itself has been the root of the mischief.

A reference to section 401 : 6 in the *Medical Digest* will show that the view taken as regards the non-ecbolic action of quinine is not singular.

ON CATARRHAL PNEUMONIA AND TUBERCLE IN THE HUMAN LUNG.

BY D. J. HAMILTON, M.B., F.R.C.S. ED., L.R.C.P. ED.,

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(*Continued from page* 98.)

ON THE EFFECTS OF LONG-CONTINUED EXCESSIVE BLOOD-PRESSURE IN THE LUNG.

SUCH then are the results of a sudden rise in blood-tension in the vessels of the lung, due to an impediment to the onward flow of blood in certain branches of the pulmonary artery, its capillaries, or the pulmonary veins. The constituents of the blood exude in greater or less quantity, and come to fill the air-vesicles, producing what is commonly known as a "croupous pneumonia." It will next be necessary to examine what changes occur in the organ as a result of increased blood-pressure *gradually* applied and continued over a long period of time.

The best opportunity for studying this is afforded in cases of chronic mitral disease,. where the blood is retarded in its flow within the pulmonary vessels, either from the constriction or incompetence of the mitral orifice. When such a lesion is suddenly produced croupous pneumonia and pleurisy are frequently set up by it. It is well known that recent valvular lesions, from the acute endocarditis of rheumatic fever, are often followed by pneumonia or pleurisy. The two are not generally looked upon as cause and effect, but there are good grounds for believing that such a relationship exists between them. The endocardium composing the valve becomes injured first, this trammels the pulmonary circulation to a corresponding degree,

and, as the injury of the valve is suddenly produced, a rapid rise in the blood-tension ensues in the lung, causing increased transudation of the solids of the blood, as before explained. That the croupous pneumonia, croupous pleurisy, endocarditis, and swellings of the joints, are all manifestations of the same disease, as is generally supposed, seems improbable, for while the pneumonia and pleurisy essentially consist in the pouring out of the solids of the blood, the others—the endocarditis and affections of the joints—are true hyperplasiæ of connective tissues, in which blood-vessels are either absent or are present in particularly small numbers, but in which connective tissue elements are abundant. I should therefore look upon the acute pneumonia and pleurisy of rheumatic fever as, in most cases, effects of the sudden interference with the pulmonary circulation, from a valvular lesion of the heart.

We all know, however, if the patient recovers from the primary effects of such a valvular insufficiency, and if the balance of the circulation has, in a measure, been restored, by the parts accommodating themselves to the new circumstances, that pulmonary symptoms more or less severe are constantly liable to arise, from the permanent injury which the valve has suffered. Hæmoptysis is frequent, and symptoms indicative of bronchial œdema are of common occurrence. Both of these effects are due to the organic deficiency in the mitral or other valve.

When the lung of a person who has suffered from such a valvular lesion is examined after death, it is found to be in the morbid state known as "brown induration." The pleural vessels are deeply congested, wedge-shaped hæmorrhages are found at its edges, and sometimes in the centre of the organ, and throughout its substance indurated patches with ill-defined borders are scattered at intervals. These indurated patches are almost like little pneumonic deposits, are only partially vesicular, and have a brownish-red colour. They are best seen in the centre of the organ, in the vicinity of the larger bronchi. The organ is also usually more or less œdematous.

When these brown and indurated patches are microscopically examined they are seen to have the appearance shown in fig. 5, which represents one entire alveolus, with portions of several others. An individual patch is made up of several lobules,

whose air-vesicles have the appearance of that in the figure. The capillaries (*a*) on the alveolar walls are distended and engorged with blood to an extreme degree. Each branch rises from the alveolar wall in the shape of a loop, and projects into the alveolar cavity for a considerable distance. The extent of this capillary dilatation throughout the lung may be conjectured from what is seen of it in a single air-vesicle. The

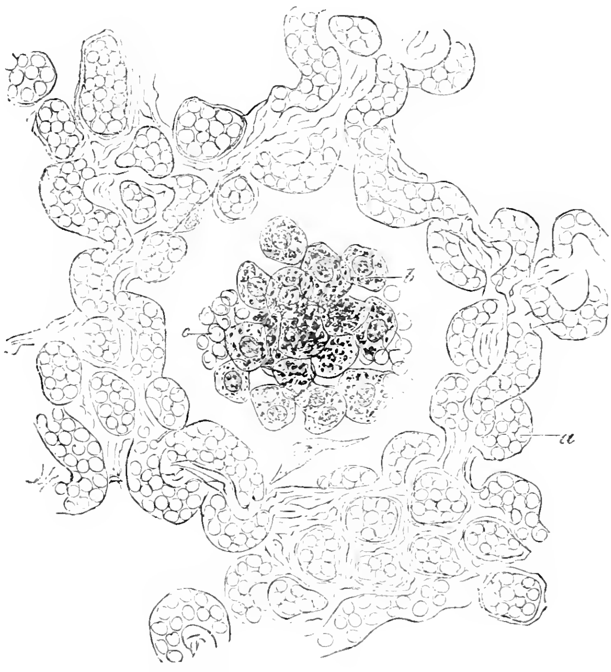

FIG. 5.—Section of an alveolus from lung of a person who died from mitral disease. *a*, distended and projecting alveolar capillaries; *b*, desquamated epithelium; *c*, blood corpuscles extravasated into alveolar cavity.

whole of the alveolar capillaries are in this condition, but those which are near a bronchus generally exhibit the greatest dilatation. The branches of the pulmonary veins and artery are also much distended, but not in so marked a manner as their capillaries.

The air-vesicles within the patches above referred to show some solid contents. They are represented in the figure. Blood

pigment of a dark brown colour is of constant occurrence. It lies free either in the alveolar cavity or in the alveolar wall, or it is contained in large cells (*b*). These cells are flat, and possess one or more nuclei. They are the epithelial cells of the alveolar wall which have desquamated, and which have been cast into the alveolar cavity. At the lower part of the figure one of these is seen on transverse section in the act of being removed from its attachment. Besides these, blood corpuscles of both kinds (*c*) are common, the leucocytes absorbing some of the brown blood-pigment. Groups of three or four air-vesicles are sometimes seen in such a patch into which hæmorrhage has occurred, part of the pigment above described being evidently derived from such extravasations.

It occasionally happens that, within certain air-vesicles, fibrin, such as is found in a red hepatization, is seen, but this is unusual.

All these appearances are due to one agent, namely, long-continued increased blood-pressure. The first effect of this is to cause widening and engorgement of the alveolar capillaries. Serum exudes from these, and carries with it more or less blood-pigment. The serous exudation undermines the alveolar epithelium, and loosens it, so that it is cast off into the cavity of the air-vesicle; while the cells, either before or after desquamation, absorb some of the blood-pigment, and incorporate it with their nuclei or periplasts. From the distended state of the vessels a few leucocytes manage to escape into the alveolar cavities, but the greater number of blood-corpuscles found in the air-vesicles are poured into them as a result of extravasation. When the distended condition of the capillaries is taken into account, it cannot be wondered at that rupture of them should constantly be liable to occur, and indeed it is remarkable that rupture is not more frequent.

The "brown induration" therefore is merely a mechanical product, and closely resembles the lesion which we saw in the walls of the bronchi under like circumstances. The distended vessels keep up a constant state of œdema of the part, which totally unfits it for the growth of proper epithelium. The cells are rejected as soon as they are formed; and it is these, along with the small hæmorrhages, which give rise to the feel-

ing of induration in the brown-coloured patches. These epithelial cells, however, are comparatively scanty, and do not seem to proliferate to any great extent after desquamation.

The effects of increased blood-pressure upon the pulmonary vessels are therefore different according as it is applied suddenly, or gradually and continued for a lengthened period. In the former, a croupous exudation is thrown out; in the latter, the capillaries become chronically distended, the epithelium desquamates, and a certain amount of serum exudes. Why is it that such a difference in the effects should thus result?

If the delicate capillary or venous wall, composed of or covered by an endothelium having natural openings or deficiencies, be suddenly stretched, a greater widening of these openings will result than in the case where the distension is of a chronic nature. The cause of this is apparent. Sudden distension of the vessel will tend to separate the one endothelial plate from the other, ending, as it frequently does, in complete rupture; but even when the latter result does not ensue, the mere stretching of the vessel will widen the natural openings between the endothelial cells, and will leave so many apertures through which the blood may escape. All these deficiencies would be repaired in course of time, and it is not hard to see that the sudden distention of the vessel is one reason why blood-corpuscles escape when there is a rapid increase of blood-pressure, and why the tendency to such is lessened, although not necessarily prevented, by its long continuance. There is, however, another reason why the blood-corpuscles do not exude in great numbers in instances of chronic regurgitant pressure from valvular lesion, namely, that there is no actual stagnation of the blood in the capillaries, but merely a retardation of its onward progress. The stream of blood passing through them, although perhaps slower in its motion, is nevertheless continuous, and hence the blood-corpuscles will tend to be swept along the natural channels rather than out at the endothelial openings in the wall. Very different is the case in acute inflammation in which there is an obstruction at one point in front, and where the whole energy of the circulatory apparatus comprised in the *vis a tergo* is consequently exerted against the vascular wall. In such a case the corpuscles are forced to pass

out at the lateral openings of the vessel, on account of the blood-current being directed into these.

But in cases of continuous increased blood-pressure it must also be remembered that the fibrin-forming albuminoids do not exude in such great quantity as where it is suddenly applied, and the reason of this is in part the same as that which we have just given to account for the small number of blood-corpuscles in the alveolar exudation of mitral disease. The wall of the vessel is less porous, and prohibits the passage of the liquor sanguinis in great quantity. Runeberg, (loc cit.), moreover, has shown that solutions of albumen, subjected to pressure within an animal membraue, transude in much greater quantity when there is a sudden accession of pressure than when the pressure is continuous and of constant amount. We can easily understand how this will apply to the case in point, where the increased pressure is continued, it may be, for many years, and where a comparatively small amount of fibrin-forming albuminoids transudes. It is undoubtedly a sudden stretching of the vascular walls which is the cause of the rapid exudation of the blood-solids, widening, as it must, all the pores of the tissues composing the vessel, and allowing of a freer transudation.

In addition to these two factors we must bear in mind that in a chronic lesion the lymphatics have had time to accommodate themselves to the new functions required of them in removing superfluous exudation, whereas in the acute disease they are suddenly called upon to discharge such functions without being prepared for the task. They become choked with fibrin so as to be temporarily useless, and the exudation still continuing to be poured out from the vessels must of necessity accumulate in the part and be forced on to its free surface. It is not until this fibrinous accumulation in the lymphatics is removed by degenerating that they are again called into play.

There is therefore no scientific difference in the determining cause of dropsy, brown induration, and croupous inflammation of the lung further than one of degree. All three are the results of the same agent differently applied. This agent is the blood-pressure, and, from whatever cause arising, if it be increased, one or other of the three lesions will result. If suddenly increased, not only the albuminoids of the blood, but also the corpuscles pass

into the tissues; and from these, fibrinous lymph, or what is the same thing, blood-clot, is constructed. If it be gradually increased, then the effects are either simple œdema of the organ or brown induration, according to the duration and degree of the pressure. I know of no relationship more important in pathology as applied to medicine than that of the effects on a part of different degrees of blood-pressure; and, in the present inquiry, if we clearly keep in view the points specially referred to in connection with this subject, it will be of the greatest aid in appreciating the true nature of catarrhal pneumonia.

Catarrhal Pneumonia—First Stage.

The course of the disease which we are now about to consider can, with the greatest justice, be divided into three stages, which correspond with three distinct phases in its clinical history. The first I call the *acute or sub-acute stage;* the second that of *caseation;* and the third that of *phthisis, or destruction of the lung.*

The first, acute or sub-acute stage, commences with what the patient usually describes—and very correctly—as "catching a cold." That is to say, he has been exposed to some vicissitude of temperature, and suffers shortly afterwards from cough and mucous expectoration. The symptoms are primarily those of bronchitis, the pneumonic phenomena being *gradually* superadded. Adults seldom die in this stage, recovery or a lapse into a chronic condition being the usual course which the disease pursues. In children, on the other hand, especially after measles or whooping-cough, it frequently proves fatal.

The lung, after death, presents the following appearances:—There is an absence of acute pleurisy, and adhesions of any kind between the pleural surfaces are rare. In this respect the disease forms a marked contrast with croupous pneumonia, in which fibrinous pleurisy is an almost constant accompaniment. The organ, when removed from the chest, feels vesicular throughout, often more so than a normal lung, from the difficulty which the air experiences in leaving it. On the surface, however, isolated lobules or groups of lobules are seen, having a leaden or purple colour and which are almost totally non-

vesicular, while the adjacent parts of the lung are more vesicular than usual, amounting, in some cases, to absolute emphysema. Solidification of the lung, as in croupous pneumonia, cannot be perceived on grasping it in the hand, and portions of it cut off do not sink in water.

The mucous membrane of the bronchi is always much congested, and from the bronchial openings more or less greyish-yellow mucous secretion can be expressed. The lung contains a medium amount of blood, and, when exposed for a short time to the influence of the atmosphere, becomes of a bright scarlet

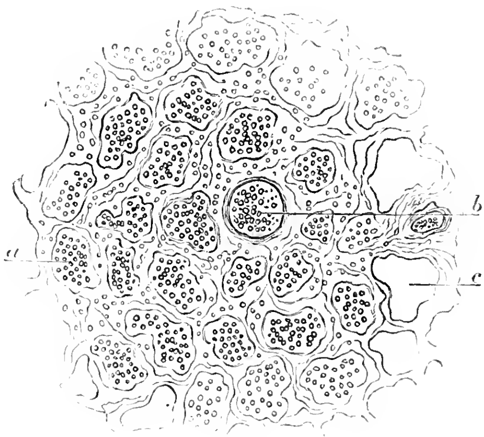

Fig. 6.—Acute catarrhal pneumonia. Group of air-vesicles and small bronchus infiltrated with catarrhal effusion. × 50 diams. *a*, infiltrated air-vesicle; *b*, small bronchus, also infiltrated; *c*, an empty air-vesicle at the periphery of the pneumonic patch.

colour. Over its cut surface, more especially towards the periphery, are seen irregularly-shaped pneumonic patches, corresponding in size to that of a lobule of the lung, which have a greyish-yellow colour, and from which, when squeezed, a little mass of yellow catarrhal fluid, like that contained in the bronchi, can be pressed out. Those patches which are adjacent to the pleura sometimes have a wedge shape. In all of them the border is extremely indefinite, and they are soft, somewhat raised, and slightly vesicular. The lung feels, when the hand is passed over it, like a mass of frog's spawn. On account of

the solidification being confined to a lobule, the name ot "lobular" is sometimes applied to this form of pneumonia, in contrast to that of "lobar" given to the croupous variety.

When such a catarrhal pneumonic patch is microscopically examined, with a magnifying power of about fifty diameters, it has the appearance represented in Fig. 6. In the centre of the patch there usually is a small bronchus (*b*), more or less distended with cellular bronchitic products, while the remainder of the patch is made up of a group of air-vesicles surrounding the bronchus, loosely packed with catarrhal cellular products. It is these catarrhal products which can be squeezed out in the fresh state from the pneumonic patch, and which give rise to the partial consolidation. There is not usually any fibrin in the exudation, so that the pneumonic patch is never so tough as in

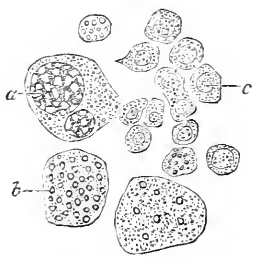

FIG. 7.—Catarrhal cells. Acute catarrhal pneumonia. ×450 diams. *a*, large catarrhal cell with two nuclei ; *b*, an epithelial plate becoming fatty ; *c*, germinating catarrhal cells.

the case of croupous pneumonia, in which, at a corresponding period of the disease, fibrin is the chief cause of the solidification. The mucus, which is largely present in the catarrhal pneumonic effusion in this stage, gives it the consistence of a viscid fluid.

The alveolar contents at this time consist of two elements —cells and a mucous fluid. Discarding the fluid part of the secretion for the present, let us more particularly examine the cellular elements. A group of these cells is shown in Fig. 7, where it will be seen at a glance that the members of the group differ in size and general contour. The form most commonly observed is represented at *a*. It is a large flat body with a finely-granular periplast and usually two or more nuclei,

N 2

and within each nucleus there is commonly a protoplasmic plexus. There is evidence, in the occasional dumb-bell shape of the nucleus, that division and multiplication have been going on. The difference in size which the nuclei frequently show (*a*) supports this idea. Certain of these cells, however, do not show any nucleus, but, on the contrary, exhibit undoubted evidence of fatty degeneration (*b*). Oil globules are visible in them, at first few in number, but, subsequently, converting the whole cell into a compound granular corpuscle (Fig. 10, *a*). Other cells of smaller size (*c*) are also abundantly found, each having a large nucleus with a delicately-granular periplast. These also show clear evidence of dividing—the nucleus first, the periplast afterwards. Some of them are occasionally seen to be fatty. A few bodies of round shape, evidently blood leucocytes, are sometimes met with, but not often, and they do not form an essential element of the catarrhal secretion. Small hæmorrhages into the deep layer of the pleura, or into the adjacent air-vesicles, are occasionally present; but they are of local occurrence, and are never in anything like the abundance found throughout the whole lung in croupous pneumonia.

The origin of such catarrhal cells is apparent when the alveolar wall is carefully examined. In the description of the natural epithelium covering the walls of the air-vesicles it was shown (Figs. 1 and 2) that although the greater number of the epithelial cells were flat scales, like those seen in an endothelium, yet that there were groups of smaller cells constantly met with among these which were more germinal in character, and which were evidently in a state of active proliferation. In acute catarrhal pneumonia the germination noticed in these groups of young epithelial cells is vastly increased, so that, instead of being scattered here and there over the alveolar surface, they entirely cover it. The older fully formed cells are cast off and soon become fatty, constituting the fatty cell-plates represented in Fig. 7 at *b*, while their place is taken by cells of an embryonic character, and much smaller in size. A drawing of the appearance presented by the alveolar wall in this stage of catarrhal pneumonia is given in Fig. 8. So far as could be learned, the child from whose lung the drawing was made had suffered from acute catarrhal pneumonic symptoms for a few days. The

reader is supposed to be looking into the interior of the air-vesicle, the part indicated by the letter *b*, corresponding to a surface view of the alveolar wall, while the letter *a* indicates the same cut transversely. A profile view of the alveolar epithelium is also thus attained at the letter *c*. The epithelium (*b* and *c*) lining the air-vesicle can now be distinctly seen, even although it was not stained with silver; the reason of this being

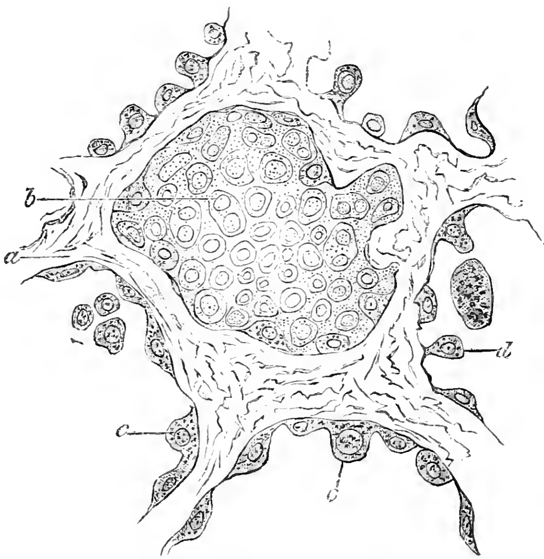

FIG. 8.—Acute catarrhal pneumonia. Surface view of the wall of an air-vesicle *a*, transverse section of alveolar wall; *b*, alveolar cavity, showing the alveolar wall covered by germinating epithelium; *c*, germinating epithelium seen on profile; *d*, one of these germinating cells becoming separated from the alveolar wall. × 400 diams.

that the cells have lost the character of endothelial scales, and have now become much more prominent objects. At the same time their protoplasm has assumed so granular a consistence that the position and borders of the cells are better defined. Instead of there being, as in the natural state, groups of germinal epithelial cells here and there, the whole alveolar wall is now covered by them. They are, however, even more germinal in character than those normally present, and, when seen on section (*c*), are noticed to project for a considerable distance

into the alveolar cavity. They are all highly nucleated, the nuclei being proportionately large compared with the periplast. Some of them have two, others three or four nuclei, and active division of these can be easily observed.

New cells are thus constantly being produced at a much greater rate than is necessary for the mere investment of the alveolar wall; and a large number, being unused for this purpose, are thrown off into the alveolar cavity as waste products. It is these which constitute the bulk of the cells found in the catarrhal-pneumonic accumulation. When the cells are being cast off they are seen first to rise above the surface of the alveolar wall (Fig. 8, *c*); the attachment of the cell then becomes more and more attenuated, until a pyriform-like cell is produced, as at *d*. The delicate stalk which still attaches this to the alveolar wall at length gives way, and then the cell is set free and is thrown off into the alveolar cavity.

The source of all these new cells is to be found in the germinal groups present in the natural epithelial lining. The older fully-formed epithelial plates are cast off, and, although they also accumulate in the alveolar cavities, take no further part in the catarrhal process.

If this description be compared with that previously given of the catarrhal changes in the bronchi, it will be seen that the two exactly correspond. For, as the deep or germinal layer of the bronchial epithelium was that from which the catarrhal cells were thrown off, so here, in the alveolar cavities, it is from germinal epithelial structures of the same nature, that the pneumonic elements are produced. In both cases the fully formed epithelial cells are primarily rejected, and take no part in the germination, while, in each instance, the catarrhal process is a mere exaggeration of that which occurs in the natural, epithelial repair.

When these germinal and other epithelial cells have been cast off, they accumulate in the air-vesicles, and, mixing with a little mucus, form what we understand as the catarrhal-pneumonic effusion. The mucus which this contains renders it viscid, and hence it tends to adhere to the alveolar walls, and can with difficulty be expelled from the alveolar cavities by

expiratory efforts. Inspiratory efforts draw it outwards towards the pleura, so that the infiltrated air-vesicles are more numerous towards the periphery than at the centre of the lung.

The appearance which the air-vesicles present when distended with catarrhal secretion is given in Fig. 9, taken from a lung in which the blood-vessels were artificially injected. Each alveolar cavity contains a mass of cellular epithelial products, closely adhering together by means of the mucous fluid in which they are suspended. The mucus is liable to become precipitated under certain circumstances, and then gives rise to a granular appearance. The epithelial cells, after being shed, have the power of maintaining an independent existence for some days, but sooner or later all of them begin to show indications that their vitality is destroyed. The first sign of this is noticed in the commencement of fatty degeneration. Oil globules appear in their nuclei or periplasts, and before long the whole cell becomes converted into a compound granular corpuscle (Fig. 10, *a*).

Why there should be such variety in the character of the cells met with in the contents of the air-vesicles in catarrhal pneumonia can now be easily understood. The largest cells, which are flat and devoid of nuclei, are the desquamated epithelial plates, the smaller nucleated bodies are the embryonal progenitors of the same, while the compound granular corpuscles are either of these in a state of fatty degeneration.

The surrounding *capillary* blood-vessels of the alveolar walls I have not found to be markedly congested in acute catarrhal pneumonia. The small arteries and veins usually contain a considerable amount of blood, but not in any very great excess of that which is seen in many normal lungs. There is no evidence of any widespread stasis in the alveolar capillaries, as in croupous pneumonia. The absence of fibrin or other blood-products in the alveolar contents shows that there has not been any sudden rise in blood-pressure.

The two diseases, croupous and catarrhal pneumonia, in their acute stages, are, therefore, totally different in their nature; for, while the former is characterised by the exudation of the solids of the blood into the air-vesicles, the latter is essentially an

epithelial proliferation. Both are probably caused by the same agency, namely, an undue amount of stimulation of the alveolar surface; and the difference in the result of this stimulation is, in all probability, dependent upon the relative strength of the circulating apparatus. In what are known as "full-blooded" individuals, with powerful hearts and a free circulation, I would expect that the reflex spasm of the arteries, and stasis of the first stage of irritation, would be followed by a much greater

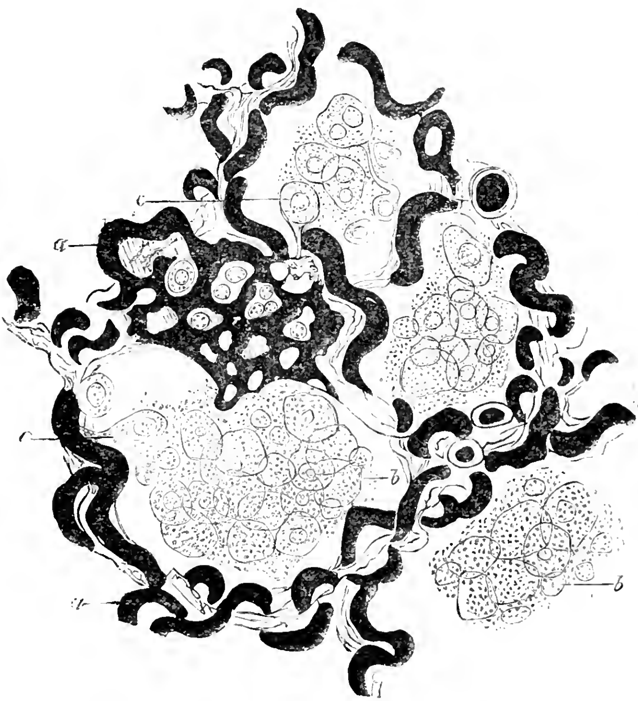

FIG. 9.—Acute catarrhal pneumonia. Blood vessels injected. × 150 diam. *a*, injected capillaries of alveolar wall; *b*, catarrhal cells lying in the alveolar cavities; *c*, the same, sprouting from the alveolar wall.

reaction, and a greater rise in blood-pressure, than in persons of a weak constitution and possessing a feeble propelling power of the heart. In the latter class of individuals, instead of the primary stasis being followed by a great increase of blood-pressure, the amount of blood and the propelling power of the

heart are insufficient to suddenly force out the solid blood constituents. The undue stimulation expends itself merely in irritating the embryonic, sentient, epithelial cells of the alveolar wall, and causes an increase in their function. The comparatively subacute course of a catarrhal pneumonia, as compared with the sudden onset of the croupous variety, coincides with this view of the two diseases; for, while the solid blood-constituents may be poured out in such quantity as to infiltrate a whole lung in a few hours, the catarrhal changes proceed much more gradually, and are usually limited to certain districts, where evidently the irritation has acted most strongly. If we produce a peritonitis—which closely resembles catarrhal pneumonia—artificially in an animal or in man, the focus of greatest proliferation is always to be found near the point of irritation. In the same way, we can easily understand that in an acute catarrhal pneumonia there may be certain groups of air-vesicles which are more stimulated than others, and in which consequently the epithelial proliferation will be most evident. In the case of a croupous pneumonia it is different, for if, in a certain lobe, or throughout a whole lung, there be vessels which are suddenly rendered impermeable in front, the whole of the blood-column entering the portions of these vessels which are still pervious will be under a greatly increased pressure, and the exudation of the blood-constituents will consequently tend to become general. It can therefore be perceived how a catarrhal pneumonia should be lobular, and a croupous lobar. The infiltration in the one is due to a local cause, but in the other it is dependent on a cause acting over a wide surface.

The catarrhal cells having accumulated within certain groups of air-vesicles, they soon all become more or less fatty (Fig. 10, *a*); and, according as this fatty degeneration is of a moist or of a dry nature, depends the future history of the case. If they undergo a moist fatty degeneration, that is to say, if serous fluid is abundantly mixed with their fatty *débris*, resolution can and probably will occur, from absorption or expectoration of the oily and albuminoid products of the cell-destruction. If, however, the fatty degeneration which the catarrhal cells undergo be of a dry, or, as it is called, caseous nature, then absorption is impossible, and the accumulated cell-products now lie in the

lung-tissue as foreign bodies, and induce what I call the second stage of the disease.

The difference in the character of the fatty degeneration which they undergo depends probably on several factors, to be more fully explained afterwards, but chiefly on one, namely, the amount of serous fluid which transudes from the vessels. The more acute the attack of catarrhal pneumonia is, and the higher the blood-pressure, within certain limits, the more probable is it that resolution will occur in the first stage. The

FIG. 10.—Acute catarrhal pneumonia, showing a thickened lobular septum and the contents of the air-vesicles. ×400 diams. *a*, compound granular corpuscles in air-vesicles; *b*, germinating alveolar epithelium; *c*, *c*, *c*, side of a thickened lobular septum running out to the pleura; *d*, oily emulsion formed by destruction of alveolar contents; *e*, a small hæmorrhage into deep layer of pleura; *f*, cellular infiltration of alveolar walls.

more insidious the onset of the first stage, the greater likelihood is there of the catarrhal products drying in the air-vesicles and undergoing caseation. The difference in the two processes, dry and moist fatty degeneration, makes all the difference between rapid recovery and the passage into a phthisis pulmonalis. Could we artificially induce, in this first stage, a slight œdema of the lung, there would be very little danger of caseation occurring. It is a remarkable and significant fact, as bearing

on this, that *individuals who suffer from mitral lesion of the heart, and whose lungs are always more or less œdematous, never, so far as my experience goes, die from caseous catarrhal pneumonia supervening upon this.* The reason is apparent, for although catarrhal changes are by no means infrequent in such lungs, the catarrhal products, when degenerating, mix with so much serous fluid that, instead of forming a cheese-like mass, they are converted into an emulsion, which can be easily absorbed or expectorated. In this way there is no chance of caseation occurring, and, as a consequence, such persons do not suffer from pulmonary phthisis.

The smaller bronchi invariably show the appearances formerly described as indicative of acute catarrh of their mucous membrane, and the lobular septa in connection with these (Fig. 10 *c, c, c*), exhibit great cellular infiltration, the result of germination of their connective tissue corpuscles.

ON THE TREATMENT OF EXOPHTHALMIC GOITRE.

BY ROBERT PARK, L.F.P.S.G., L.S.A., ETC., GLASGOW.

An article by Dr. Gibson in the *Lancet*, for December 27th, 1879, tempts me to relate the treatment of a case which fell under my observation about ten years ago.

Previously I had met with many cases whilst acting as assistant or *locum tenens* in various parts of England. None of them presented features of special interest or remark, however, and this one was chiefly notable for the intensity of all the ordinary symptoms, plus œdema of lower half of the body and extremities. It came under observation whilst I was in charge of the practice of the late Dr. Wiglesworth of Cinderford, Forest of Dean.

The patient was a female, æt. 36, and a multipara. When I first saw her she was sitting in an arm-chair opposite the open door, where I was informed she had sat constantly for six successive days and nights: and more or less constantly for a longer period, being unable to move or be moved. Her dress, partially undone at the neck, disclosed an asymmetrical goitre about the size of a large melon: carotid pulsations of an exaggerated kind: oral respiration and orthopnœa; very prominent exophthalmos, a considerable margin of both sclerotics being exposed superiorly. The cardiac action was very turbulent and distressing to the patient: and there was a loud murmur best heard over the base and systolic. The pulse was 160. The lower half of the body and inferior extremities were œdematous, and I was informed that complete insomnia had prevailed for three weeks. The patient was now very sleepy, but could not sleep on account of the cardiac turbulence.

The whole attention seemed to be given up to one object: viz. that of respiration. The urine was loaded with amorphous urates: but the heat test failed to reveal presence of albumen.

This description, though very incomplete, will suffice to show that the case was at least urgent, and indicated an unfavourable prognosis.

The question, however, for the practitioner was, what was to be done? How was the woman to be relieved as speedily as possible of her dreadful suffering?—for relief seemed to me the only thing to be hoped for in such a case.

Firstly I had the patient's feet and legs, which were cold, set in a bucket of hot water. Then after waiting and observing that this gave no adequate relief: and bearing in mind the benefits which had recently been obtained in many quarters in many diseases from morphia employed hypodermically, I determined to give her an injection. I specially warned the neighbours and the patient herself of the critical nature of such treatment under the circumstances, however. Both patient and friends were so eager that relief should be obtained anyhow that consent was readily obtained.

The late lamented Dr. Anstie, who left the impress of his thoughts upon the minds of most of those who read his works, had just been writing upon this subject, and had, if I am not mistaken, formulated the proposition that as morphia, hypodermically administered, declared its physiological effects immediately: the dose might be regulated in accordance with this fact. In this case, therefore, I determined to test again (I had previously tested it in a case of acute mania) the value of this proposition in practice. After injecting 1 minim ($\frac{1}{6}$th grain) and finding no effect in five minutes, I injected another minim, and continued to repeat this operation (the syringe being *in situ* all the time) every five minutes, till in all 12 minims or 2 grains had been injected The operation thus extended over an hour, and it was only during the last few minutes of this period that calmative effects were being manifested. Even at the end of the period there was scarce *any* obvious contraction of the pupils, which were still dilated beyond the norm. Gradually the calmative effects became more and more pronounced, and at the end of an hour

from cessation of injection I had the inestimable satisfaction of seeing the patient doze over into a comfortable snooze, from which as I ascertained at my next visit she was always easily aroused, and which altogether did not endure beyond eight hours.

At my next visit I found her symptoms in all respects less urgent, and during the remainder of my stay at Cinderford I went over as often as I could, and gave her an injection of from one to two grains of morphia: and when I left, Dr. O'Keefe, who took up the practice, continued to do the same.

Twelve months after, I wrote to the Doctor, asking him about this patient and others, and he wrote to me saying that at that time the patient "was quite well and going about."

It is to be inferred from this that the morphia in this case acted not alone palliatively but remedially: and the case may be considered worthy of record if for no other purpose than to suggest reflection as to the *modus operandi* of morphia when used hypodermically: and its use thus in large contrasted with small doses. I must confess that experience of its use in this way, in other cases as well as in this, has led me to believe that it acted mostly through the pneumo-gastric, by increasing the inhibitory function of that nerve: and in goitre I was in the habit of regarding the palpitation and incoordination of cardiac action as a reflex phenomenon due to pressure upon the recurrent laryngeal branch of the pneumogastric. Dr. Gibson favours Trousseau's view, which attributes increased dominion to the sympathetic in the sphere of the cardiac action. Trousseau (quoted by Bryant in his *Surgery*) states that "the numerous functional disorders which occur in Grave's disease are either due to temporary congestion of the sympathetic nerve, or a permanent structural alteration of the ganglionic nervous system:" and, bearing on this, in the *British Medical Journal* for December 15th, 1877, p. 852, a very interesting case is transcribed illustrating successful treatment by galvanisation of the first cervical ganglion of the sympathetic.

The enormous preponderance of females over males subject to goitre might be cited, and has been cited, in favour of Trousseau's pathology. (*Vide* Dr. Braxton Hick's "Croonian Lectures.") Dr. I. B. Yeo, again, maintains the opinion that

a "neurosis of the emotional centres" lies really at the base of all the phenomena.

On the other hand there are cases on record, *passim*, indicating an excentric pathology; such cases, *e.g.*, which have got well under purely local treatment, as by passing of setons, and induction of suppuration otherwise, &c.

Granted, however, that a centric pathology is necessary, as in the majority of cases I believe it is, to explain adequately *all* the phenomena of goitre, it still remains to be determined whether the neurosis is the result of long-continued congestion or anæmia. So far as I have been able to ascertain by reference to such authorities as are by me, no evidence of a conclusive kind seems to be on record as to the post-mortem condition of these centres in goitrous patients dying as the result of goitre, or, still more important, of intercurrent affections in early stage of goitre.

It seems to me that, so far as our present knowledge goes, the action of morphia in a case such as that narrated might have a considerable number of explanations, as *e.g.*—

Induction of congestion in supreme centres intensifying their inhibitory function on all the lower; induction of congestion in emotional centres, in addition to above, with the same result; consentaneous induction of anæmia of pneumo-gastric nucleus and ganglia of sympathetic: being the pathological correlative of the inhibitory act.

Or the morphia may be held to cause anæmia of the congested sympathetic ganglia directly: thereby allowing the normal action of the pneumogastric to have full sway.

Or further, it might be supposed to induce congestion of the pneumogastric nucleus, thereby stimulating it and raising its inhibitory powers above their norm.

However it may be explained physiologically, certain it is that the effects of morphia used hypodermically are very marked upon tumultuous cardiac action proceeding either from a reflex or organic cause: and that these effects frequently require large doses to produce: and that they cannot be obtained by any known means of administering the drug by the mouth.

OBSERVATIONS ON MEDICINAL PEPSIN AND ARTIFICIAL DIGESTION.

BY G. F. DOWDESWELL, B.A. (CANTAB.), F.C.S., F.L.S., &c.

THE different preparations of medicinal pepsin are numerous and very extensively employed, but although previous experiments have shown that there exists a great difference in activity between the various brands, nothing is known certainly as to the relative power of each, nor is there any guide to the selection of the most effective. In 1857, some comparative observations upon three different sorts were made, and published by Dr. Sieveking, in the *Medical Times and Gazette;* in these experiments he employed coagulated egg-albumen, chopped finely; two of the preparations tried were of German make, and were found materially inferior in digestive power to the third used, which was Boudalt's. Subsequently, in 1863, Dr. Pavy made some further experiments with different preparations, comparing their action upon the legs of frogs; of those which he tried he found all inert, excepting only that of Messrs. Bullock and Reynolds; his results were published in the *Lancet* of that year. Afterwards, in 1870, Professor Tuson instituted and published [1] a long series of careful comparative experiments on the relative activity of six different preparations; the names of the makers of these, however, are not given, excepting that of Messrs. Bullock and Reynolds, whose pepsin was found to be very much more active than any of the others tried, one-half of which proved to be practically devoid of any proteolytic power.

These experiments sufficiently show the great difference

[1] *The Lancet*, 13 Aug. 1870.

which exists in the value, as a remedial agent, of the various preparations of pepsin, and the necessity for investigation. Having had occasion to employ some samples myself, I was desirous of ascertaining their relative activity, by testing them experimentally; the general results of this investigation are here published in the hope that they may be useful to others, who have occasion to employ this agent, and have not the opportunity of testing its activity themselves, and that a description of the methods used, and points which have occurred during the work, may assist those who shall engage in the same line of experiment.

The essential action of the gastric juice is proteolytic—the conversion of proteids into peptones; it also possesses the property of coagulating milk, precipitating its casein, and this, as has been shown, independently of any acidity; but these effects are probably the result of two distinct ferments, which coexist in the gastric juice, and which may be separated by suitable means; for by heating pepsin as usually prepared, its power of coagulating milk is destroyed, while its proteolytic action remains unimpaired; and when prepared by Brücke's method it does not coagulate milk, though an extremely active proteolyte. Whatever may be the value, from a therapeutical point of view, of its coagulating power, this must be a distinct question from that of its proteolytic action. Pepsin has no action upon starch; the gastric juice too, by its acidity, as is generally stated, hinders or destroys the amylolytic action of the saliva in the stomach, though Richet[1] asserts that the action of diastase on starch is increased in an acid medium. This however is a mistake, for I found that on adding equal small quantities of fresh saliva diluted and filtered,[2] to two portions of starch paste, kept at 38° C., one of which was acidulated with 0·2 per cent. HCl, while in the neutral preparation the conversion of the starch, as indicated by Fehling's test, commenced very quickly, and was shortly completed, as shown by iodine; in the acidulated preparation, on the other hand, there was no trace of

[1] *Du Suc gastrique, &c.* Paris 1878, p. 116.

[2] I used fresh saliva as being much more active than any preparations of diastase that I could obtain; the action of which on starch was entirely prevented by 0·2 per cent. HCl.

sugar for some hours, and its complete transformation was indefinitely delayed. Pepsin has no action upon fat nor on either cane or grape sugar. It is generally said to hinder septic fermentation, but this, as remarked by Hoppe-Seyler and Richet, is a misstatement; the gastric juice is anti-septic, but it is so owing to its acidity, and not to any property of pepsin. I have found experimentally that if pepsin be added either to fresh urine or to hay infusion, it has no power to arrest septic fermentation and the development of bacteria, but, on the contrary, rather favours it; while if albumen be dissolved by pepsin, and the solution be then neutralised by Sod. Carb., it becomes most unmistakably septic and develops numerous organisms very rapidly, whereas if hay infusion be made acid by 0·02 per cent. HCl, fermentation is altogether prevented.

I have found that neither 1 per cent. of salicylic acid nor of sulphate of quinine appreciably interferes with the proteolytic action of pepsin. Borax is said by Dumas and by Schutzenberger to destroy the activity of all soluble ferments so decidedly as to serve as a test of whether one be of the soluble or of the organic class; but I have found that added in the proportion of 1 per cent. to the solution of pepsin, though it slightly retards its action, it does not prevent it.

The object of these experiments, then, was to test the proteolytic power of various preparations of medicinal pepsin. This may be done by different methods. First, by ascertaining the weight or quantity of each preparation requisite to dissolve completely a given weight of albumen or other proteid in a certain time; this is a convenient and sufficiently accurate method, and is the one here adopted. Some observers, as Bidder and Schmidt, have estimated the amount digested in a given time by weighing the residue, but in the case of coagulated albumen there is this inconvenience, that by maceration in acidulated water, it swells up, and increases in weight to the extent sometimes of 50 per cent., as I have ascertained experimentally. Others have estimated the amount of peptones contained in the solution, and this no doubt, in theory at least, is the most accurate method, but it is unnecessarily laborious for the object here in view. Another method, employed by Grützner, is a colorimetric one; the fibrine to be used is stained by carmine

and by comparing with a standard scale the coloration of the solution, the amount of fibrine dissolved is estimated. This with care would probably give reliable results, which might satisfy the observer, but would be less suitable for the information of others than the more definite statement of given weights and time. There are some other methods which may be used, but they are open to objections, from which the first above named is free, and which is that here employed.

I have examined fifteen different preparations of pepsin as named below, which[1] Mr. Martindale, of New Cavendish Street, was good enough to supply me with for this investigation ; I have generally used the same sample of each, excepting in the case of liquor pepticus (Benger), when, requiring a further supply, some of a different sample was received ; this proved to be much more active than the first, and the result finally recorded is that afforded by this second sample.

I used coagulated egg-albumen in preference to fibrin, because it is more easily prepared in an uniform state of subdivision, and being wholly soluble without residue, the progress of digestion is readily watched and its completion ascertained. I found fibrin, either obtained from blood or the muscle of beef or mutton, very much less satisfactory to use. As far as my experiments went, I observed no difference in the relative activity of the various preparations, in their action upon fibrin, to that upon albumen, and as Professor Tuson has already shown (*loc. cit.*) that in the case of the preparations of pepsin which he examined "their relative digestive powers on fibrin are very nearly the same as those upon albumen," I did not think it necessary to experiment further in this direction. The state of subdivision of the substance to be digested very materially affects the rapidity of the process, and for comparative experiments it is in the highest degree requisite that this should be perfectly uniform. To effect this, the white of eggs previously hard boiled and cooled, freed from all membrane and yelk, was pressed through wire-gauze, in the first experiments, of about ten meshes to the inch, in the later, much finer, of about twenty-

[1] Excepting Wyeth's preparations, which were received from a friend to whom they had been sent by the proprietors to be tried.

four meshes to the inch;[1] this reduced the albumen to perfectly uniform grains or strips, not exceeding in diameter the size of the mesh. Of this the requisite quantity (in all the recorded experiments 100 grs.) was weighed out and placed in a small beaker. The beakers used were of similar size and shape; any difference in this respect might affect the results, for a preparation placed in a wide vessel offers a larger surface to the action of the solution, and also facilitates the diffusion through it of the products of digestion, thus accelerating solution in the same manner as constant agitation, or, more perfectly, the peristaltic movements of the stomach. The presence of air or oxygen, too, is essential to the action of the gastric ferment, and consequently the experiments should be conducted in vessels lightly covered. If air was excluded entirely, I found that though occasionally agitated the albumen was changed to a mass of caseous appearance and odour, which remained undissolved for an indefinite time, but upon admission of, and agitation with, atmospheric air, it was quickly dissolved. Frequent, or at least occasional, agitation of the preparation is requisite, for in examining some anomalies which occurred in the course of these experiments I found in some cases, though not apparently in all, that if coagulated albumen, in an acidulated solution of pepsin, be left perfectly undisturbed at a temperature of 38° C. for some hours, it formed an insoluble combination with a strong caseous odour and appearance,—very similar to that which is formed when air is excluded—which is not re-dissolved on the addition of fresh ferment, nor upon repeated agitation, but is so readily when fresh acid is added. This is more apt to occur, though not solely, in the case of the less active preparations, which require to be added in larger quantities. This result is obviously as important, in every point of view, as it was unexpected, not having been, as far as I am aware, noticed previously; and well merits farther investigation.

To the albumen thus prepared, an ounce of distilled water acidulated with 1 per cent. of hydrochloric acid of sp. gr. 1·150 (= 0·303 per cent. HCl) was added; this I found to be the most favourable degree of acidity for promoting digestion in

[1] I found that the coarser of the two preparations required fully half as long again for complete solution as the finer one did.

these experiments. If it deviated materially from this the result was much affected; if it were reduced one-half or increased to four times the quantity digestion was greatly retarded or wholly prevented. Most writers on artificial digestion state that 0·1 to 0·2 per cent. HCl, or less, is the degree of acidity most favourable to the digestion of albumen, fibrin requiring a smaller degree of acidity.[1] These results seem to be adopted from Bidder and Schmidt's analysis of the gastric juice or Brücke's experiments. Professor Tuson alone, as far as I have seen, states "that the result of special experiments indicates that this degree of acidity (1 per cent. by volume of concentrated hydrochloric acid) was more favourable to digestion than an acid of greater or less strength." Taking five preparations with a given quantity of albumen, weight of pepsin and volume of water in each, I acidulated them respectively with 0·1, 0·2, 0·3, 0·6, and 1·2 per cent. HCl, with the following results:—

No. 1.	0·1 per cent. HCl		not digested in twenty-four hours.
„ 2.	0·2	„	not digested before eight hours.
„ 3.	0·3	„	digested in six hours.
„ 4.	0·6	„	not digested in ten hours.
„ 5.	1·2	„	not digested in twenty-four hours.[2]

Fibrin is said to require a smaller degree of acidity for its digestion than albumen. The quantity of water present too was found materially to affect the results; the weight of albumen and of the ferment used remaining the same, if the water was much increased or diminished the digestion was retarded. In one experiment where the quantity of water (in this case to five grms. albumen) was increased from thirty c.c. to ninety c.c., the digestion occupied double the time that it did with the first

[1] Statements as to the acidity of the gastric juice in man vary somewhat; no doubt it alters from different circumstances, as Manassein has shown in pyrexia artificially induced in dogs. The normal acidity in man is generally given at 0·2 per cent. HCl. Some, however, have found a greater degree of acidity, fully 0·3 per cent. (Hoppe-Seyler, *Physiol. Chem.* t. 2, s. 220). Richet (*Op. cit.* p. 91) gives some interesting observations, in a case of gastric fistula in man, on the effect of various substances ingested, upon the acidity of the gastric juice, and states that alkalies do not, as generally thought, increase its acidity, but that wine, which is always acid, does increase it, and brandy still more so.

[2] The degree of acidity was actually a fraction higher than that given above, *vide* p. 201.

quantity, and when it was reduced to fifteen c.c. it was indefinitely retarded.

The water having been added, the ferment, if in powder, was weighed out, and placed in a watch-glass on the beaker, which was labelled; when all was ready it was emptied into the beaker, which was then covered with the watch-glass and placed in the warm chamber at 38° C. (100°·4 F.). The warm chamber was such as is in general use in physiological laboratories, with glass sides and furnished with Page's regulator, by which the temperature can be kept perfectly constant without difficulty: this is a point of the very first importance in these experiments, for a difference of only a few degrees materially affects the activity of the ferment, and if disregarded will produce anomalous, and altogether unreliable results.[1] The temperature I employed was, as stated, 38° C. (100° F.), about that of the stomach in man, which is slightly increased during digestion (Ransome). Peptic digestion is promoted by an increase of temperature at least to several degrees above this point, up to, as is generally stated, about 50° C. (122° F.), above which it diminishes, and is stopped at 90° C. (191° F.). I have found that it is materially retarded by being lowered a few degrees only below 100° F., and in some of the earlier experiments before this point was appreciated it occasioned some trouble and anomalous results, but by the use of a Page's regulator there can be no difficulty in this respect: these details may seem trivial, but I have experienced their importance, and attention to them will save time and trouble to others who may institute similar experiments.

The following tables show the final results of this examination. No. I. shows the action of the maximum and minimum quality of each preparation recommended by the makers to be used; of the fifteen preparations tried nine were active in these quantities, and these, together with the second sample (B) of No. 2, which had been found to be much more active than the first, were then examined in order to ascertain the smallest quantities in which they were capable of dissolving the albumen employed as a test. The less energetic brands also were examined in the other direction, the quantity of each being

[1] Petit states that the same pepsin is four times less active at 40° than at 50°.

gradually increased, till, if practicable, it was found capable of effecting the solution. The results of these examinations are given in Table II., which also represents a series of experiments made simultaneously and repeated more than once, with the quantity therein specified of each preparation; an isolated experiment was seldom made, and never relied upon to establish any conclusion; the different preparations were always tried simultaneously under the same conditions, nearly always in duplicate, and the experiment repeated several times.

TABLE I.

Showing the result of the action in four hours at 100° *F. of different preparations of Pepsin, in the quantity specified, on* 100 *grs. of coagulated egg-albumen, in* 1 *oz. of dilute Hydrochloric Acid,* 1 *per cent.*

	Preparation.	Reaction.	Quantity used.	Result.
1	Glycerine of Pepsin (Bullock)	Acid	f. ʒ i.	All dissolved.
2	Liquor Pepticus (Benger) A. .	,,	f. ʒ i.	Not dissolved.
	,, ,, B. .	,,	f. ʒ i.	All dissolved.
3	Pepsin Wine (Morson) . .	,,	f. ʒ i.	Not dissolved.
4	Pepsin Essenz (Liebreich) .	,,	f. ʒ i.	,, ,,
	,, ,, ,, .	,,	f. ʒ iii.	,, ,,
5	Pepsina Porci B. P. (Bullock)	,,	grs. ii.	All dissolved.
6	Pepsin B. P. *ex ovibus* (Wright and Layman)	Faintly Acid	grs. ii.	Not dissolved.
	,, ,,	,,	grs. v.	All dissolved.
7	Pepsin B. P. *ex ovibus* (Hopkins and Williams) . . .	,,	grs. ii.	Not dissolved.
	,, ,,	,,	grs. v.	All dissolved.
8	Saccharated Pepsin (Finzelberg)	Neutral	grs. iii.	Not dissolved.
	,, ,, ,,	,,	grs. vi.	All dissolved.
9	Starch Pepsin (Boudalt) . .	Acid	grs. v.	Not dissolved.
	,, ,, ,, . .	,,	grs. x.	All dissolved.
10	Pepsin Porci B. P. (Morson).	,,	grs. ii.	Not dissolved.
	,, ,, ,,	,,	grs. iv.	All dissolved.
11	Starch Pepsin (Morson) . .	,,	grs. x.	,, ,,
12	Saccharated Pepsin (Wyeth) .	Neutral	grs. ii.	Not dissolved.
	,, ,, ,,	,,	grs. v.	,, ,,
13	Lactopeptine	Acid	grs. x.	,, ,,
	,,	,,	grs. xv.	,, ,,
14	Ingluvin	Faintly Acid	grs. v.	,, ,,
	,, ...	,,	grs. x.	,, ,,
15	Compressed Peptonic Tablet (Wyeth)	Acid	1 Tablet.	,, ,,

The above gives the minimum and maximum doses directed of each preparation.

No. 2 B was a second sample received of the same preparation, found to be much more active than the first (A); subsequent experiments were made with the second sample (B).

Nos. 8 and 9 appeared to be exactly the same make.

TABLE II.

Showing the results of experiments to ascertain the least quantities of the various preparations of Pepsin capable of completely digesting 100 *grs. of coagulated egg-albumen under the same conditions as in Table I.*

	Preparation.	Quantity.	Result.
1	Glycerine of Pepsin (Bullock)	f. ʒ ss.	All digested.
2	Liquor Pepticus (Benger) B.	f. ʒ i.	,, ,,
3	Pepsina Porci (Bullock)	gr. ½.	,, ,,
4	Pepsin B. P. *ex ovibus* (Wright and Co.) .	grs. iv.	,, ,,
5	,, ,, (Hopkins and Co.) .	grs. iv.	,, ,,
6	Saccharated Pepsin (Finzelberg)	grs. v.	,, ,,
7	Pepsin Porci B. P. (Morson)	grs. iv.	,, ,,
8	Starch Pepsin (Boudalt)	grs. vi.	,, ,,
9	,, ,, (Morson)	grs. x.	,, ,,
10	Lactopeptine	grs. xv.	Not dissolved.
11	Ingluvin	grs. xx.	,, ,,
12	Saccharated Pepsin (Wyeth)	grs. x.	,, ,,
13	Pepsin Wine (Morson)	f.ʒ iv.	,, ,,
14	Pepsin Essenz (Liebreich)	f.ʒ iv.	,, ,,
15	Compressed Peptonic Tablets (Wyeth) . .	4 Tablets.	,, ,,

The results of this examination, on the whole, *i.e.*, in the case of the large majority of the preparations, must be regarded as highly satisfactory; most of the brands show a high degree of energy, very small quantities dissolving in a few hours a large amount of albumen, though some few, as was anticipated, have failed. I have only to add that each experiment here recorded was repeated more than once, together with a very large number of others not recorded, the examination having been in fact a very long one, embracing twenty-three series containing upwards of 200 individual experiments and many more observations. The object proposed was solely to ascertain the *relative* proteolytic power of the different preparations; to this end each one in every series of experiments was submitted to identically the same conditions; the whole series of the final experiments gave precisely the same comparative results. Very imposing statements are sometimes made as to the absolute digestive capacity of this or that preparation; with such I have nothing to do; under slightly different circumstances as to temperature, the degree of acidity, dilution of liquid, frequency of agitation, &c., different results are certain to be obtained, but that will not

affect the question of the relative activity of the different preparations under the same conditions, with which alone I have dealt, and in this view only these results are offered.

POSTSCRIPT.—Since the above was written an article has appeared in the *Journ. de Pharm. et de Chimie* for January of this year (p. 82), by A. Petit (translated in the *Pharmaceutical Journal* of January 24th), on testing pepsine, which gives an excellent account, with many useful particulars of the process. He rejects the test by coagulation of milk, prefers that by fibrin to that by coagulated egg-albumen, states the effects of temperature, the comparative action of various acids, the most favourable degree of acidity, which, with hydrochloric acid, he finds to be 0·15 per cent. of real acid, conformably to the statements generally published; in other respects his conclusions, as far as comparable, correspond with my own, as given above. The degree of acidity, in the experiments in Table I., p. 199, was actually a fraction higher than that given there; for, to avoid the possibility of error, the strength of the acid employed was estimated gravimetrically by precipitation with $Ag. NO_3$. Its sp. gr. at 60° F. being 1·150, two, almost identical, determinations gave the percentage by weight of HCl as 30·30, which agrees exactly with the strength given in the tables of Davy, and is a little lower than that of Ure; the B. P. giving 31·8 for a solution of 1·16 sp. gr.

Reviews.

How to Use a Galvanic Battery. By H. Tibbits, M.D., &c. (Second Edition.)

A fair estimate of the scientific value of this book may be gathered from the following extract (p. 63). Speaking of a "rigid form of infantile paralysis" the author says:—"If these cases depend upon adhesions or exudations into the medulla, their absorption may possibly be promoted by localizing a voltaic current in the superior cervical ganglia of the sympathetic; two small conductors . . . . being applied for four or five minutes to the bottom of the auriculo-maxillary fossæ on both sides. There seems no doubt that such an application causes a dilatation of the vessels at the base of the brain, and is likely therefore to promote absorption."

These few sentences are a "multum in parvo" of bad physics, questionable pathology, and hypothetical therapeutics. If we speak strongly it is because we feel so. Electro-therapeutics, if they are to escape from the stigma of semi-quackery, with which unfortunately they are too generally associated in the professional mind, require their exponents to adhere to stricter methods and language than has generally been the case hitherto.

The Heart and its Diseases, with their Treatment, including the Gouty Heart. By J. Milner Fothergill, M.D., &c. London: H. K. Lewis. 1879.

Dr. Fothergill's new work upon the heart—for a book which has been entirely rewritten cannot be properly described as a new edition—is as original as the rest of this author's writings. Its leading feature is its thoroughly interesting style. From beginning to end it is neither dull nor insipid; whilst throughout its entire length certain grand principles are kept steadily before the mind of the reader. Herein, indeed, as might be expected, lies the weakness as well as the strength of Dr. Fothergill's work. Necessary details are frequently neglected where they might have been given; the pathological anatomy is often weak;

the physical signs receive less than their proper share of attention; and clearness is occasionally sacrificed by the want of method that is displayed in the arrangement of the subjects. The most interesting chapter to us, and one which bears abundant testimony to the ample grasp which Dr. Fothergill has of his subject, is the chapter on treatment of diseases of the heart. Treatment is the best test of a medical author, not only because it is the end of all medical knowledge, but also because it is the application of the principles which have guided him throughout the earlier parts of his work. It was by his treatment of disease of the heart that Dr. Fothergill's name first became known; and the chapter is worthy of the reputation which he then gained, and to which he has steadily added. It opens with a thoroughly sound estimate of the value of rest in cardiac disease, and of the danger of an implicit trust in that remedy. The extreme importance of rest during and after acute endocarditis is forcibly insisted on, and deserves to be universally remembered. The various "cardiac drugs" are then discussed, digitalis naturally receiving most attention. We cannot expect to discover in such a work as this anything very novel therapeutically, but it is a pleasure to find the substance of our knowledge on such valuable measures as digitalis, belladonna, strychnine, ammonia, and alcohol, as well as hydragogue purgatives, diuretics, and diaphoretics, presented to the mind of the reader in a form which is not only at once concise and complete, but also thoroughly intelligible and very interesting. Dr. Fothergill's book will be widely read, and as widely appreciated.

The Pathology and Treatment of Venereal Diseases. By FREEMAN J. BUMSTEAD, M.D., LL.D. Fourth Edition, Revised, Enlarged, and in great part Re-written by the Author, and by ROBERT W. TAYLOR, A.M., M.D. Philadelphia, 1879.

THIS well-known work has been brought well up to date by the author and Dr. Taylor, has been considerably increased in size, and is much more liberally illustrated than in previous editions; but it has necessarily, in the process, lost something of its individuality. It is one of the best general treatises on venereal diseases with which we are acquainted, and is especially to be recommended as an admirable guide to the treatment of syphilis. In order to render the book as complete as possible Dr. Taylor has introduced several woodcuts of the histological characters of various syphilitic lesions, with a more elaborate account than heretofore. But we do not see that the introduction of short chapters on such affections as simple hydrocele, non-specific ecyeme of the scrotum, &c., adds in any way to the general efficiency of the work.

Clinic of the Month.

Treatment of Mucous Polypus of the Nose.—Mr. Harrison has recently adopted a treatment in cases of polypus of the nose which has given good results. He finds that these growths consist of but little more than connective tissue infiltrated with serum, inclosed in something resembling mucous membrane; when removed by avulsion and exposed to the atmosphere they rapidly shrivel, a result which is due to the escape of their serum, the distended, grape-like appearance being in a short time exchanged for one represented by a few shreds of connective tissue. The treatment consists in freely puncturing these growths from the anterior nares by means of an ordinary acupuncture needle, thus allowing the fluid, of which they largely consist, to drain away. To prevent them frem refilling the patient is ordered to inject into the nostrils a solution of carbolic acid glycerin, which has a most marked drying-up effect, and to continue to do this daily and thoroughly for some time. Cases have been successfully dealt with in this way—when the growths have been of a limited nature, and the patient averse to their avulsion. In one case punctures were made with one of Southey's trocars, which answered well, the serum escaping through the canula. Mr. Harrison, therefore, regards these growths as being local and limited œdemas rather than hypertrophies, and as being, when once emptied, curable by astringents. (*The British Med. Journ.* Nov. 15, 1879.)

Potassium Permanganate in Diphtheria.—Dr. R. F. C. Brown states that he has injected hypodermically the permanganate of potash, well diluted, in several cases of diphtheria of malignant type, and has found that the cases readily yield to treatment by this method. One of the cases was in his own person. In addition he used a spray of the same solution in the throat. In fact the writer believes that he has found a specific for this disease. (*The London Medical Record,* Oct. 15, 1879.)

The Action of Salicin and Salicylic Acid in Acute Rheumatism.—Dr. William Squire, in a paper read before the Harveian Society, divides the subject into two parts: the first dealing with the therapeutics of acute rheumatism generally, the second with the effects of salicin and salicylic acid on the disease, and with the objections raised to its use. Salicylate of soda may be given to patients at all ages and in all stages of the disease; not only is cardiac disturbance quieted, but the pulmonary congestion, meteorismus, diarrhœa, and profuse perspiration of persistent rheumatic fever in debilitated persons are relieved, and the pale urine deficient in acid in these prolonged cases is soon restored to its normal quality. In acute rheumatism salicylate of soda is to be preferred to salicylic acid: since it is readily soluble, is neither irritant nor disagreeable if well diluted, is more readily absorbed, and its effects are much more prompt, certain, and manageable. Five grains of the salt equal four grains of the acid, a sufficient dose for a child of six to eight years old; adults require three or four times this quantity. It must be given every two or three hours until evidence of its action is obtained, and this is usually forthcoming after the third or fourth dose. When six or eight have been given in this way they need only be continued every five or six hours for another day, and can be resumed in the same way if fresh pain or fever arise. Salicylic acid must be converted into salicylate of soda in the blood before the action on rheumatic fever begins: a definite quantity of the acid can be dissolved in presence of potash, lithia, or ammonia, and may be so given with or without effervescence. (*The Lancet*, Dec. 20th, 1879.)

Aconitia in Neuralgia.—The affections known under the general name of neuralgia, which are so painful, and in the majority of cases so difficult to treat, have for a long time been the subject of constant investigation at the hands of a number of experimenters. Clinical experience has recently demonstrated the powerful anti-neuralgic action of crystallised aconitia, and the excellent results which have been obtained by the use of this remedy in the hands of Dr. Oulmont have fully confirmed the opinions in regard to it which have been already advanced. Aconitia, says Dr. Oulmont, is perfectly successful in such forms of facial neuralgia as are not correlated with other lesions, which are not intermittent, and which have not a well-marked recurrence; in other words, in those forms to which M. Gubler has applied the term congestive, and which are most frequently caused by exposure to cold. In such cases aconite produces a rapid cure within two or three days. Dr. Oulmont has even seen a case of facial neuralgia of seven days standing, in which there was no well-marked periodicity, and which had

resisted sulphate of quinine, yield instantaneously and permanently to a quarter of a milligram of nitrate of aconite. The results are more marked and rapid in cases of recent neuralgia than in those of long standing. Examples are quoted, however, in which the affection had lasted for periods of one month, two months, and even five years, but which had yet been cured, the first on the seventh day, the second on the third, and the last in three weeks. Aconitia has also a distinct effect in secondary neuralgia, as, for example, in dental caries, otitis, paraplegia, &c., &c. Acute rheumatic arthritis may be successfully treated with aconitia. In four individuals to whom this remedy was administered in doses, at first of half a milligram per diem, increased gradually to one and a half milligrams, a cure was effected, once in eight days, and once in ten days. The temperature fell from 39° to 36°, and the pulse in proportion. In the other cases the cure was equally obtained, but only on the fifteenth and eighteenth days respectively, whilst the dose was raised to two and a half milligrams. The antipyretic action, however, was equally well marked, whilst the temperature fell on the eighth and ninth days about two degrees. The results obtained by M. Gubler are also noteworthy. The results of four cases were published; in these the patients were treated with hypodermic injections of half a milligram once or twice a day, whilst half a milligram of aconitia, which was gradually increased till this quantity was taken two to four times a day, was administered internally. In these cases a cure was effected upon the sixth, ninth, twelfth, and thirteenth days: in one case there was a slight stiffness of the joints. The influence of the remedy upon the painful symptoms was very rapid upon the second to the fourth days, whilst upon the fever it was slower, though not less marked. The effects are very remarkable according to M. Gubler in cases of neuralgia of the fifth. Dr. Oulmont concludes his work with the statement that aconitia is a remedy of importance, since it acts in a certain definite manner upon the human organism, but from its activity it must only be employed in very small doses and at long intervals. Neuralgia is often accompanied by intermittent symptoms and well-marked periods. In such complications quinine must be employed in addition to aconitia. On account of the energetic action of the remedy the susceptibility of the patient should be tested by administering, in the first place, three pills daily, each containing a fifth of a milligram of crystallised aconitia in addition to five centigrams of pure quinine; one in the morning, one at midday, and one in the evening. If no alleviation of the pain is experienced on the first day, the dose may be cautiously augmented by a pill per diem, until a maximum dose of six in the course

of twenty-four hours is attained, and in the majority of cases it will not be necessary to overstep this limit. If slight diarrhœa occurs, the dose must be reduced. Physiological experiments and clinical observations carried on in the Paris hospitals have shown us that these pills have a sedative influence upon the circulatory apparatus through the vaso-motor nerves, and it is concluded therefore that they are indicated in neuralgia of the fifth, in congestive neuralgia, in painful and inflammatory rheumatic affections, &c., &c. (*Le Progrès Médical*, Dec. 6th, 1879.)

Treatment of an Erectile Tumour by the Injection of Chloral.—In a case of rapidly extending erectile tumour, situated in the naso-palpebral region, Dr. Antonio Pupi, after failing to arrest the disease by other methods, succeeded in curing it by injecting chloral into the base of the tumour. He was led to try this method from the fact that chloral is not only a hæmostatic and cicatrisant, but that it also has the power of coagulating recently drawn blood, the coagulum so formed being insoluble. Three injections were made, at intervals of fifteen days ; the strength of the solution being 1 to 10 of distilled water. Each injection was followed by tumefaction, which, however, was painless, and lasted only four or five days. The cure was so complete that the traces of the tumour could be detected only by one who was acquainted with the case. (*The Glasgow Medical Journal*, Dec., 1879.)

The Therapeutic Effects of Alkalies in Diabetes.—Dr. Cornillon has studied at Vichy the effects of the waters upon diabetic patients. He finds that after the fourth or fifth day, sometimes even sooner, the thirst and dryness of the mouth become less troublesome, and inappreciable after the tenth day in favourable cases, and after the thirtieth day in the most obstinate. The patient passes better nights, and the sleep is calm. During this period the urine, previously acid and light coloured, has become alkaline and of a yellowish orange. The appetite, instead of being disordered, becomes regular, the improvement being most marked at the end of the first week, and it may be said broadly that the alkaline treatment tends to re-establish the functions of the stomach and intestines. The patients, who have previously lost much flesh, begin again to make up and even increase upon their original weight. The drynes of the skin is replaced by suppleness, whilst the sweat reappears. The vinegar-like smell and the anaphrodisia remain, however, with the most enduring obstinacy, but the latter symptom yields to a certain extent after the continuance of the treatment for some years. As the diabetes diminishes the dimness of vision

tends also to decrease. If hæmorrhage has occurred in the eye however, no treatment with alkalies will restore the impaired visual faculties. The alkaline bath is, according to Dr. Cornillon's experience, the best method of applying the treatment locally, and he does not hesitate to order it every time it is felt to be needed, in concurrence with internal treatment. In tuberculosis occurring in diabetic patients, Dr. Cornillon believes that the use of alkalies is not contraindicated. He finds that the pulmonary lesions are not extended, whilst the general symptoms produced by the tubercle are slightly diminished, the symptoms produced by the diabetes, such as thirst and weakness, the daily loss of sugar, &c., disappearing or decreasing under the alkaline treatment. Dr. Cornillon terminates his article in the following words:—It sometimes happens that in diabetes uncomplicated by progressive anæmia the treatment with alkalies gives no results; but this want of success is not common, and when it occurs it is to be attributed rather to an idiosyncrasy of the patient than to failure of the remedy. It may occasionally be noticed that the favourable influence of the alkalies is only transient, that the thirst and dryness of the mouth soon return, and that the sugar reappears in the urine if it had disappeared, and increases in quantity if it had previously undergone a diminution; it does not, however, attain to its original amount. (*Le Progrès Médical*, Dec. 20th, 1879—Jan. 3, 1880.)

Chloral.—Some authors have asserted that chloral is not soluble in fatty bodies, but in the *Rep. de Pharm.* M. Catillon shows that this statement is erroneous, and he proposes various formulæ which it may be useful to reproduce.

Chloral dissolves in oil in all proportions under the influence of a slight elevation of temperature, and in cold three parts of oil dissolve two parts of hydrate of chloral.

Chloral liniment:

Hydrate of chloral	6 parts.
Oil of sweet almonds . . .	30 parts.

Rub together in a mortar, and assist the solution by gently heating the mixture over a water bath.

Chloral ointment:

Hydrate of chloral	6 parts.
Lard	27 parts.
White wax	3 parts.

Melt together, having previously powdered the chloral. The wax is not indispensable, and may be omitted unless a very firm ointment is desired. Equal parts of wax and chloral yield a mass of the consistence of plaster. Suppositories may also be

prepared with white wax and cacao butter, containing one part of chloral in five, or even one part in three. (*The Dublin Journal of Med. Sci.*, Dec., 1879.)

Venous Pulse on the Back of the Hand in Phthisical Patients.—M. Peter (*Jour. de Méd. et de Chir.* Jan.) has frequently remarked a phenomenon in phthisical patients which has a certain prognostic importance. It is a kind of venous pulse, which he has described in a communication to the Société Clinique. The first case he observed was that of a woman who had reached the last stages of tuberculous asphyxia. It was noticed that the veins on the back of her hands were bluish, turgid, and tortuous. They were the seat of marked pulsations, especially manifest at the angles of the curvature, the inflection of which got straight again quickly. This pulsation was made still more apparent by slightly compressing the wrist so as to impede the venous circulation, and thus render the vein more turgid. The venous pulsations elsewhere were more visible than palpable, the impulse of the venous wall not striking the finger in the same way as that of the arterial did; but the eye could reckon the venous pulsations and determine their synchronism with the arterial pulsations, just as the radial pulse could be counted by the finger. M. Peter has occasionally but rarely observed the same phenomenon in other analogous conditions. In order to explain the mechanism of this venous pulse, M. Peter admits that the muscular fibres of the arteries in certain half-asphyxiated subjects, as in these phthisical patients, are paralysed by an excess of carbonic acid in the blood, and that then the arteries suffer the blood to pass from them into the capillaries without having changed the interrupted progression into a continuous progression. Two other factors necessary to the production of this form of venous pulse are the frequency of the beats of the heart and their force. During the last moments of life, when the beats become feeble, the venous pulse disappears. This phenomenon is moreover very rare, but when it exists it has an important prognostic value, since it is an indication of rapidly approaching death. (*The Dublin Journal of Med. Sci.*, Dec., 1879.)

Extracts from British and Foreign Journals.

The Treatment of Pneumonia.—Dr. Schultz, in the treatment of croupous pneumonia, has attempted to limit the disease, to treat the disease itself, to treat the fever, to prevent and treat exhaustion of the heart, and to manage disagreeable or dangerous symptoms. When called during the first stage of the disease, that of engorgement, Dr. Schultz administers drop-doses of the fluid ext. aconiti radicis every hour, and 20–30 grains of the subchloride of mercury either in one dose or in five-grain doses repeated every three hours. This treatment is persisted in till the 24–36th hour after the chill. Acting upon the principle that pneumonia is a general disease with a local manifestation, the author has employed the tincture of bryonia in mild cases, administered in drop-doses every two hours throughout the whole stage of hepatisation, and when resolution set in he combined the drug with expectorant doses of ipecacuanha. In cases where there was high fever with but slight remissions, no diarrhœa or diarrhœa with greyish or greenish discharges, vomiting, considerable bronchial catarrh, in sthenic cases in adults, and in almost all cases in children, the subnitrate of mercury in $\frac{1}{50}$—$\frac{1}{100}$ grain doses every three hours was administered. When there was marked bronchial catarrh, and when in the stage of resolution the bronchi were obstructed with mucus, antimon. and potass. tartr. $\frac{1}{10}$—$\frac{1}{12}$ of a grain every hour or two was found to be beneficial. In the large class of asthenic cases, which either existed from the first or which became so in the course of the disease, phosphorus given in Warner's compound pills of phosphorus, one pill every three hours, was of the utmost value; in those cases in which it was desirable to repeat the dose more frequently, the tincture of phosphorus in drop-doses combined with $\frac{1}{6}$—$\frac{1}{10}$ of a drop of the fluid ext. nucis vomicæ was administered. Whenever the temperature did not rise above 102° during the first five or six days, and there seemed to be no imminent danger from cardiac exhaustion, the fever was left untreated, except that a nutritious diet and a small allowance of stimulants were ordered.

When the temperature rose above 102° during the early part of the disease, or when the heart showed signs of failing, with a lower temperature, 15 grains of quinia, in solution with hydrochloric acid, was given in the evening, and the dose was repeated if necessary in forty-eight hours. In all cases where resolution had not set in by the fifth to the seventh day, with an almost normal temperature, a full dose of quinia was given on the evening of the fifth to the seventh day. When collapse had once become fairly developed, quinia seemed to hasten the fatal end. To prevent cardiac fatigue, a nourishing diet was relied upon, eggs, milk, and whisky being given; the latter in half-ounce doses every two hours, in those cases in which the fever was high and the previous history led to an expectation of an early collapse. As soon as the heart showed signs of failing three to six grains of camphor were administered every three or four hours until the danger was passed. In cases in which the pulse was distinctly intermittent digitalis proved valuable, and was generally sufficient to cause the disappearance of this abnormal condition. Under the treatment here mentioned it has been but rarely necessary to treat symptoms. The pain in the side has only occasionally been so severe or persistent in its nature as to render a turpentine stupe, a poultice, or a mustard plaster necessary, whilst cupping, blistering, and opium have never been resorted to for this purpose. The cough when very distressing was rendered more easy by the free exhibition of morphia and opium. The vomiting yielded after twenty-four to forty-eight hours to mercury and ipecacuanha. The sleeplessness has always been left untreated. Where the alvine secretions did not become normal under the general treatment, a few doses of opium with acetate of lead brought speedy relief. Collapse was treated with camphor, wine, whisky, and a large mustard plaster to the chest, but in no case when it had once become fully established could the patient be rescued, though life was prolonged by these means for twenty-four to seventy-two hours. Convalescence was usually prompt and uninterrupted. In some cases it became necessary to prescribe a tonic, and a pill of cinchonidia, iron, arsenic, and gentian then brought good appetite and a speedy return to strength. The material upon which this account of the treatment of pneumonia is based was afforded by ninety-four cases of croupous pneumonia, which Dr. Schultz met with in the period from May, 1875, to May, 1879. Of these ninety-four cases only eight died. (*The American Practitioner*, Sept. 1879.)

Treatment of Strychnia Poisoning.—Dr. Smith records a case in which strychnia poisoning was counteracted by the administration of 15—20 grams of bromide of potassium within

an hour. During the last half hour the rigidity became less and less marked, and vomiting, accompanied by nearly complete relaxation, ultimately occurred. With occasional muscular twitchings the patient fell asleep and awoke to recovery without an unfavourable symptom, returning to his work on the third day. (*The Chicago Med. and Surg. Journ.*, Sept. 1879.)

A Micrococcus from Gonorrhœa.—Dr. Neisser has discovered a form of micrococcus in the discharges from patients suffering from gonorrhœa. The preparations are made after Koch's method, by which the secretion is spread out in a thin layer and is allowed to dry; it is then stained with an aqueous solution of methyl violet, is again dried, and is examined with a very high power, such as a $\frac{1}{12}$th oil immersion lens with No. 4 or 5 ocular. The nuclei of the pus corpuscles are then seen to be stained of a dark violet blue, the protoplasm of the cells being scarcely visible, a greater or less number of micrococcus heaps are also seen, which have a characteristic and readily distinguishable appearance. The individual micrococci are circular, of considerable size, and are readily stained by the methyl violet and dahlia. They may also be coloured with a strong solution of eosin, but they are not then so readily distinguishable from the nuclei of the pus corpuscles, which have on this account been called eosinophilous cells by Ehrlich, as by the use of methyl violet. They remain however unstained in methyl green and indulin. With less perfect objectives the micrococci appear to be surrounded with a bright ring, which is apparently a mucous coat. Single forms are however rare, for two are generally seen lying so close together as to give the impression of a single organism of a biscuit, figure of eight, or roll shape. The different forms which are thus seen may best be explained by reference to the development. Thus the isolated micrococcus is round; it soon grows to an elongated oval, but still short corpuscle, which undergoes constriction in the centre to form two new organisms. It has not yet been decided whether the numerous biscuit-shaped forms which were observed are due to the continued coherence of the two single micrococci or to the division of the cells which is so rapid that a single individual is but rarely observed. Finally, the single micrococci separate and remain at a slight distance from each other, about equal to the size of a single micrococcus. Shortly afterwards each individual micrococcus again divides, but this time in a direction at right angles to original line of fission. In this way each corpuscle again divides into two, and thus small groups of four are produced. The micrococci in the majority of cases form colonies of ten, twenty, or more individuals, which are surrounded by a mucous investment. The

individuals which form these colonies never lie close together, but are separated by intervals from each other. The micrococci usually lie upon the upper surface of the pus corpuscles, but only rarely upon the epithelial cells. The individual pus corpuscles, which are covered with micrococci, possess no nuclei: in other cases a distinct diminution in the corpuscles could be observed, corresponding to the ingrowth of the micrococci into the nucleus. This observation disproves the theory that the organisms are merely the results of the destruction of the nuclei. The micrococci were observed in thirty-five cases of gonorrhœa, which had continued for three and twelve days, three weeks, seven and nine to thirteen weeks respectively. In a gleet of eighteen months' standing these bodies could not be detected. In five cases which had been treated with zinc, and sulpho-carbolic solution, no organisms could be seen in spite of the very copious secretion. In every case examined this particular form of bacteria and no other was alone present, and it was wanting in all other specimens obtained from other sources. The same micrococci were found in large numbers in seven cases of ophthalmia neonatorum, which Dr. Neisser had an opportunity of examining. The ophthalmia had lasted one day, three days, three, five, and six weeks. The organisms were also present in two cases of gonorrhœal ophthalmia in adults. (*Centralblatt f. die med. Wiss.*, July 12, 1879.)

Tetanus.—Dr. Fox, remarking upon the pathology of tetanus, states that he has found (1) areas of cord softened so as to be almost diffluent; (2) hæmorrhage outside the spinal dura mater, and gummy-looking fluid beneath the arachnoid; (3) distension of the vessels and thickening of the membranes; (4) fissures of the posterior white column; (5) softening of the cord and many amyloid bodies in the grey matter; (6) creamy posterior columns, the softening seeming to be composed of colloid bodies. Dr. Fox believes that none of the lesions yet found can be considered as in any way causes of tetanus. It is not likely, he thinks, that the blood is at fault, as in strychnine poisoning, a condition so analogous to tetanus. The results at which Prof. Yandell arrives, from a careful analysis of three hundred and eighty-five published, and thirty unpublished cases of tetanus, are as follows:—(1) traumatic tetanus is most fatal during the first decade of life; (2) it usually supervenes between four and nine days after the injury; (3) the largest numbers of recoveries are found in cases in which the disease occurred after the lapse of nine days from the injury; (4) when tetanus continues fourteen days, recovery is the rule, death the exception, apparently independent of the treatment; (5) tetanus arising during the

puerperal state is the most fatal form of the disease; (6) chloroform has, up to this time, yielded the largest percentage of cures in acute tetanus; (7) the true test of a remedy for tetanus is its influence on the history of the disease, (*a*) as to whether it cures cases in which the disease occurred prior to the ninth day after the injury, (*b*) whether it fails in cases whose duration exceeds fourteen days; (8) tried by these tests, no agent has yet established its claims as a true remedy for tetanus. (*The Birmingham Medical Review,* July, 1879; *The Louisville Medical Herald,* Sept., 1879.)

Cutaneous Eruptions caused by Hydrate of Chloral.—Dr. Martinet has arrived at the following conclusions, which are interesting in so far as they bear upon the question of eruptions caused by remedies. (1) The ingestion of chloral produces an exanthematous eruption in a certain number of individuals, which may be called chloralic erythema. In some cases too urticaria and purpura have been observed after its administration. (2) The erythema appears on the face, neck, abdomen, over the large joints, upon the extreme surfaces, and upon the back of the hands and feet, &c. It occurs after eating, and after drinking alcoholic beverages. There is frequently no fever, and the duration of the eruption is very short. (3) The eruption is often accompanied by dyspnœa and intense palpitation. (4) The phenomena are only observed in persons who are predisposed to it. (5) It appears to be due to a paralysis of the vaso-motor centres in the same way as in the accompanying dyspnœa and palpitations. Eruptions due to chloral have been observed by Schüle in Germany, and by Creighton Brown and Winter Fisher in this country. French writers scarcely allude to them, with the exception of M. Mayor, who has brought forward an interesting communication upon the subject. In nearly all the cases published by M. Mayor and M. Martinet it was found that the eruption reappeared on renewing the dose of chloral. The amount of chloral required to produce the eruption does not appear to be of any great importance from the point of view here adopted. The explanation of its causes as given by M. Martinet, although probable, yet remains to be proved. (*Thèse de Paris,* 1879; *Le Concours Médical,* July 19th, 1879.)

[In consequence of a press of matter the Notes and Bibliography are unavoidably postponed.]

Department of Public Health.

ON AN OUTBREAK OF CHOLERA IN AN INDIAN VILLAGE.

BY SURGEON-MAJOR CORNISH, F.R.C.S.,
Sanitary Commissioner for the Madras Presidency.

[A CORRESPONDENT has placed at our service a copy of the following important memorandum by Surgeon-Major Cornish. As an illustration of the difficulties, both natural and artificial, surrounding etiological investigation in India, it is almost unique. —*Ed.*]

The Army Sanitary Commission, in their review of the Madras Sanitary Report for 1876, commented on the imperfect and defective report given by Dr. King, the then Acting-Sanitary Commissioner, of an outbreak of cholera which occurred in February, 1876, in the village of Kankampatti in the Salem District. The Secretary of State having called attention to it, the following memorandum was drawn up by the Sanitary Commissioner, giving detailed particulars of the outbreak with his own observations thereon.

Note on the Cholera outbreak in the village of Kankampatti, Salem District, in February, 1876.

An outbreak of cholera in an Indian village is by no means of rare occurrence, but the circumstances in connection with this particular village formed the subject of an inquiry and report by the Tahsildar of the taluk, the Head-Assistant Collector and Collector of the district, at the time of the outbreak. Of these officials, the two former were present in the village

during the progress of the cholera outbreak. Some months subsequently the village was visited and reported on by Dr. H. King, Acting-Sanitary Commissioner, whose report has been criticised by the Army Sanitary Commission in regard to the alleged defective proof of the assigned causes of the outbreak, *i.e.*, importation and diffusion by polluted water.

Feeling the importance of recording all the facts that can be ascertained relative to special cholera outbreaks, I have gone over all the papers in my office relating to the occurrences at Kankampatti, and have been in communication with Mr. Le Fanu and A. Venkata Suba Row, the late Tahsildar of the taluk, with reference to certain points in which their original reports were not clear. All the facts bearing on the question are here embodied in narrative form. The manuscript notes moreover have been submitted to Dr. H. King for such comment as seemed fit.

The Collector of Salem, in a letter dated the 24th February, 1876, reported officially to the Board of Revenue "a most unprecedented outbreak of cholera" in a small village (Kankampatti) in the Utankarai Taluk of his district. The village in question contained 48 houses and 202 inhabitants, and from the 3rd to the 18th February there had been at the least 64 cases of cholera, of which 56 proved fatal. The actual number of persons attacked is not recorded. The Collector of Salem distinctly says, "there was nothing apparent in the situation or exceptionally dirty state of the village to account for the outbreak." On receiving information of the circumstances Mr. Longley directed his Head-Assistant to proceed at once to the village with a medical subordinate to afford aid and report the facts. The Tahsildar, A. Venkata Suba Row, had already been in attendance at the village from the 13th February, and had taken an active part in the measures for abating the cholera epidemic before Mr. Le Fanu's arrival. Mr. Le Fanu, Head-Assistant Collector, arrived at the village on the 17th February, and his report, dated the 18th February, on what he saw and did is as follows:—

"With reference to your official telegram, dated 15th February, 1876, I have the honour to inform you that I proceeded to Kankampatti and inspected the village.

"2. Up to my arrival there had been some fifty-two deaths, but yesterday there was only one death. Several persons in the village were convalescent, and there were only four bad cases, a Mussulman and his son of about twelve years old, a girl about the same age, and a boy of about eighteen months. I administered medicine to all these and gave them (except the infant) a dram of arrack, as they were very weak.

"3. The rubbish of the village had been burnt before I arrived, and the backyards fairly cleaned. I ordered them to complete the cleaning of the backyards and to erect a latrine to leeward of the village. It is worth noticing that although Chinna Kankampatti is only about 200 yards distant from Kankampatti and to the windward of it, there has not been a single case of cholera in the former village. Fires were lighted and tar burnt in the village, and an embargo placed on a suspected well.

"4. The disease was imported by some people who came from Dharampuri for a marriage. One of the party who, however, recovered, used this suspected well, and the villagers having used it afterwards, caught the disease. This well is also to leeward of the village, whereas the other to which they were now ordered to resort is to windward. Two villagers who caught the disease fled to Kallavi, where they died, importing the disease with them. The Tahsildar had already sent assistance to Kallavi, and I have told my dresser to proceed there, after which he must go to Menasi,[1] where his services are required. The Tahsildar has burnt the clothes of the deceased persons along with the dead bodies.

"5. The Monegar made no report about the outbreak at Kankampatti. He told me that he was afraid of doing so. I am loath to punish him, as I think that he has behaved well. He has stood his ground, though greatly scared, and when the toty fled and there was no one[2] to carry the dead bodies, he took them himself on his head to the burial-ground, where, however, as there was no one to bury them, they lay partially eaten with jackals until the Tahsildar came and burnt them.

"6. As no report was made regarding this village, your telegram was the first intimation I received. The medical staff, who are behaving splendidly, are very much overworked, and I propose, when the epidemic subsides, recommending them for a special gratuity. I have reported in another letter to you that one of the vaccinators has fled. His place should be filled up at once."

The subject is further elucidated by a demi-official communication from the Tahsildar to Mr. Longley, Collector of Salem, dated 19th February, 1876, inclosing the daily cholera report with explanatory notes.

"As directed by your honour, I went to Kankampatti on the 16th again. As I mentioned, the burial-ground was strewed with dead bodies, half-eaten by jackals, &c. I piled them all up in one place and burnt them. I have also burnt all the beds, pillows, clothes, &c., belonging to the deceased persons and which contained filth, &c. I have burnt tar and sulphur on all sides. There was only one fresh case on the 16th, but none on the 17th and 18th. The Head-Assistant Collector had visited the place on the 17th and done all that was necessary to improve the

[1] Seven deaths are recorded as occurring in Menasi in February 1876.—W.R.C.
[2] This misled me to suppose that the villagers had fled *en masse*.—Dr. King.

sanitary condition of the village. He personally gave medicine to some people that were still suffering. The dresser also is come here. The epidemic is now very much on the decrease, and so the place is very much better now."

Daily Report[1] *of Cholera in the undermentioned villages of the Utankarai Taluk.*

Date.	Names of the Villages.	Population.	Number attacked.			Number died.		
			Males.	Females.	Total.	Males.	Females.	Total.
From the 6th to 13th	No. 287 Kankampatti	202	...	...	63	27	20	47
14-2-76	,, ,,	...	...	...	...	...	2	2
16 2-76	,, ,,	...	1	...	1	2	...	2
17-2-76	,, ,,	...	...	...	...	1	...	1
18-2-76	,, ,,	...	...	...	...	...	1	1
	Total..........	202	1	...	64	30	23	53

Remarks.—" The Village Munsif reported only 2 deaths as having occurred on the 5th instant. He made no report afterwards, but having heard of the outbreak of cholera in the place, I went to the village on the 13th, and then came to know that many deaths occurred. The exact number of deaths or the names of persons that died could not be ascertained till the evening of the 14th. The deaths that occurred on the 14th, 16th, and 18th are all old cases, but that of the 17th is of the previous date."

So far as we have gone then it is clear from the evidence of Messrs. Le Fanu and Venkata Suba Row that (1) a violent explosion of cholera occurred in Kankampatti in February, 1876; (2), that the outbreak followed on the arrival of strangers to be present at a marriage in the village; (3), that one of the strangers was the first to be attacked; (4), that no cholera existed in the village before the arrival of the strangers; (5), that a village or hamlet, 200 yards distant, during the outbreak in Kankampatti remained quite free of cholera; (6), that the water-supply of Kankampatti was suspected by the gentlemen who saw the village and people while cholera was actually prevailing; (7), that cholera was believed to have spread from Kankampatti to one or more villages by means of persons deserting their homes during the panic caused by the outbreak. Dr. King, the Acting-Sanitary Commissioner, was directed by Government, under date 6th March, 1876, to make a thorough

[1] This is the ordinary form of report sent direct to the revenue officials when cholera is prevailing in a village. —W.R.C.

investigation of the circumstances brought to notice by Mr. Longley. At this time he was engaged on a tour of inspection duty in another part of the country, and no opportunity presented for inspecting the village in the Salem District until August, or six months after the cholera epidemic had ended. Meanwhile a specimen of water of the suspected village well had been examined and reported on by the Chemical Examiner. Dr. King's inspection notes and the Chemical Examiner's report on the water are here appended :—

"This small village (Kankampatti) of forty-eight houses and 202 inhabitants, according to the census of 1871, acquired an undesirable notoriety in February last by an outbreak of cholera of extreme severity. Fifty-six deaths occurred in five days; the survivors fled, leaving unburied corpses in the lanes and houses, and carrying the disease to other villages.

"2. The village consists of a group of huts placed without any attempt at regularity, and separated by very narrow tortuous lanes, and small yards in which cattle are kept. The spread of any disease communicable from man to man was thus favoured; and the notion that cholera is not so communicable (although unfortunately entertained by some physicians of experience) would be, in the present state of our knowledge, ridiculous if it were not pernicious. The disease was introduced by a person who, coming from the Dharampuri Taluk to a wedding, spent the night before his arrival in a cholera-infected village. He was taken ill in Kankampatti, but recovered. The next attacked was a girl, an inmate of the house in which the wedding was taking place. She also recovered, but never left the premises while her illness lasted. Those who believe that the disease is propagated by the excreta of patients will not be surprised to hear that ten other inmates of the house died of cholera.

"3. The extreme virulence of the epidemic remains to be explained, and the inquiry into the water-supply of the village disclosed the cause at once. There is no water in the village itself, which is built on high ground, and the only source of supply, for all purposes, is a small 'ghuntah' (open square well), not more than thirty feet square, about a hundred yards away, and considerably lower down. Between this and the village is a field which, no doubt, receives a fair proportion of the excreta of the inhabitants, and the surface drainage of which flows without impediment into the ghuntah. It was a matter of course that water thus polluted should be found on chemical analysis unfit for drinking, and that its use would predispose to the reception of cholera poison; but this is not enough. While the villagers continued to use this water, and this only for drinking and cooking, clothing, including that of those who were affected with cholera, was washed in the ghuntah. In the opinion of all authorities, except a crotchety few, there could be no more effectual means of spreading the disease more widely in its severest form.

"4. There is nothing unhealthy in the site on which the village stands. The ghuntah was condemned, and the further use of its water forbidden. Water is now taken—by all, I was informed—from a large well about 200 yards away."

Analysis of Water from Kankampatti, Salem.

Colour	Greenish, partly removed by filtration.
Taste	Mawkish.
Smell	Somewhat uriniferous.
Turbidity	Slight, removable by filtration.
Reaction	Alkaline.
Deposit	Confervæ and animalculæ,
Total solids	110 grs. per gallon.
Volatile solids	45 grs. do.
Chlorine	10·5 grs. do. as common salt.
Total hardness	13°3 grs. do.
Permanent	12°2 grs. do.
Free ammonia	0·127 parts per 100,000.
Albuminoid ammonia ...	0·122 do.

Quantity of water too small for further analysis.

(Signed) A. PORTER, M.D.,
Acting Chemical Examiner.

It will be apparent that a "thorough investigation" into the circumstances connected with the cholera outbreak six months after the event was scarcely practicable. The only wonder is that so many details could be then collected, and that they should have, substantially, agreed with the independent statements of the officials who saw the village while cholera was in progress. A single sanitary official for a population of thirty millions cannot hope to have the opportunity of "thorough investigation" in regard to cholera outbreaks occurring simultaneously in hundreds and thousands of villages.

The publication of the report by Dr. King in his monthly proceedings attracted the attention of the Sanitary Commissioner with the Government of India, who, in a letter dated 21st December, 1876, to the Sanitary Commissioner, Madras, requested that the officials who reported on the outbreak of cholera in Kankampatti might give categorical replies to a list of questions inclosed. The questions and answers are here given :—

Q. 1.—The date on which the man who is supposed to have introduced the disease arrived in Kankampatti.

A. 1.—The person who first introduced the disease was a girl who accompanied her parents to Kankampatti to be present at the marriage. She arrived at Kankampatti on the night of the 1st February. They came through villages where there was cholera.

Q. 2.—The date when he was taken ill.

A. 2.—On the 3rd February 1876, but recovered.

Q. 3.—The date on which the wedding took place.

A. 3.—The wedding did not take place, owing to the spread of cholera in the village.

Q. 4.—The dates on which the fifty-six deaths occurred, and, if possible, the daily distribution of the cases also.

A. 4.—The daily distribution of deaths was as follows :—

Date.	No. of Deaths.
February 6th	2
Do. 7th	7
Do. 8th	9
Do. 9th	10
Do. 10th	11
Do. 11th	7
Do. 12th	3
Do. 13th	2
Do. 14th	2
Do. 16th	2
Do. 17th	1
Total ...	56

Q. 5.—How long the people continued to use the polluted water of the ghuntah?

A. 5.—Till the 12th.

Q. 6.—How many cases occurred among the inhabitants of Kankampatti after they left their village?

A. 6.—Only[1] five persons fled from the village to Kunathore, where three of them were taken ill and died.

Q. 7.—When did they return to their village?

A. 7.—The surviving two returned to Kankampatti after the disease entirely left it; the rest of the inhabitants remained in the village.

Q. 8.—What water did they use on their return, and were there any cases of cholera then?

A. 8.—The inhabitants have ever since they were told to abandon the polluted well (that is from the 12th February) been using the water of another well, and no cases of cholera have since occurred.

On the statements included in the Annual Sanitary Report for 1876 before them, the Army Sanitary Commission make the following comment :—

[1] This answer is not in accord with the Munsif's statement, who says four people from Kankampatti were taken ill with cholera in Kunathore, two of whom died, and two recovered.—W. R. C.

"In the Salem District in January there were 303 cholera deaths in 46 villages with a population of 55,852; and in February, during which Kankampatti was attacked, 61 villages, with a population of 86,159, yielded 286 cholera deaths. It is necessary to note these facts, as they have an important bearing on certain views on the cause of this cholera outbreak, stated by the Acting-Sanitary Commissioner, Dr. King, who was directed by Government to make a 'thorough investigation,' and the following foundation is apparently the one on which this important duty was based: 'The notion that cholera is not so communicable (*i.e.*, from man to man), although unfortunately entertained by some physicians of experience, would be in the present state of our knowledge ridiculous if it were not pernicious.' The reporter then proceeds, 'The disease was introduced by a man who, coming from the Dharampuri Taluk to a wedding, spent the night before his arrival in a cholera-infected village. He was taken ill at Kankampatti, but recovered. The next attacked was a girl, an inmate of the house in which the wedding was taking place, she also recovered, but never left the premises while her illness lasted. Those who believed that the disease is propagated by the excreta of patients will not be surprised to hear that ten other inmates of this house died of cholera.'

"The reporter further expresses his opinion that the survivors carried cholera in their flight to other villages. Such is the account given by Dr. King of the origin of cholera in this village. Subsequent inquiry, however, showed that the first case took place, not in a man, but in a girl, who was attacked on the 3rd February, two days after her arrival in the village, but recovered, and moreover it turned out that the wedding did not take place, owing to the spread of cholera in the village.[1]

"The following facts given by the local native official who replied to certain questions sent to him by the Sanitary Commissioner with the Government of India, go far to clear up the case and to show that altogether, apart from any views about contagion, there was in all probability a direct relation between the outbreak and a bad sanitary state of the village.

"The village of Kankampatti, with 48 houses and 202 inhabitants, was one of 61 villages in which cholera existed in February, 1876, in Salem District. The case of the girl who recovered took place on February 3rd as already stated. The following was the subsequent history of cholera in the village:—

Date.	Deaths.
February 6th ...	2[2]
Do. 7th ...	7
Do. 8th ...	9
Do. 9th ...	10
Do. 10th ...	11
Do. 11th ...	7
Do. 12th ...	3
Do. 13th ...	2
Do. 14th ...	2
Do. 16th ...	2
Do. 17th ...	1
Total ...	56

[1] The Army Sanitary Commission do not appear to be aware that a Hindu wedding and its preparatory ceremonies go on for days or weeks. The non-completion of the ceremonies was evidently due to the outbreak of cholera in the house.—W. R. C.

[2] These two cases were seized with cholera on the 5th.—W. R. C.

"There can be no question of the virulence of an outbreak of which 56 people out of 202 died in eleven days. The 'survivors' however did not fly[1]—only five of them—of whom, however, three died in the neighbouring village where they had taken refuge. No account is given of what took place in this village (Kunathore), so there is nothing to support Dr. King's statement[2] that the survivors carried the disease to 'other villages.'

"We have seen that cholera existed in great intensity[3] in Salem District; considering, however, the smallness of the village and its position on high ground, it possibly might have escaped if it had been in good sanitary condition. But no account is given by Dr. King of the state of the houses except that they are placed irregularly, and separated by very narrow tortuous lanes, and small yards in which cattle are kept.

"There is no water in the village, and the supply for domestic use was obtained from a small 'ghuntah' about 30 feet square, 100 yards away, and considerably lower down, into which flows the surface drainage (as is supposed), polluted by excreta and washing of cloths. This water was used up to the 12th February, after which other well water was provided, and the native official states that 'no cases of cholera have since occurred.' The information as a whole is far from being sufficient to account for the severity of the outbreak, but accepting the facts as they are, they appear to bring the case within the usual category of Indian village attacks and, among other causes, they appear to justify (so far as the facts go) the opinion expressed by Dr. Cornish himself, 'that the use of impure water in this case must have contributed to the number and fatality of the cases.' But there is no sufficient evidence that the outbreak was due to importation. The dates and facts of the epidemic are against this view, and the statistics show that the outbreak followed the usual course of epidemics in a sudden rise and slower decline. It is moreover quite possible that the girl's case might not have been cholera, or that it might have been really due to the state of the house she went to, and to the use of impure water. She is said to have passed through villages where cholera was at the time, but there are neither dates nor detailed facts to show the relation of this circumstance to her own illness, neither is any information included in the report to show the relation of her attack (or even the nature of it) to other attacks in the village. It would have served the object of the inquiry directed by Government much better if the sanitary state of the village and house had been thoroughly inquired into, and if the cases were really connected with that of the girl it is obvious (as long since pointed out in our instructions for the cholera inquiry) that every step of the evidence connecting her case with other village cases should have been given."

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[1] This assumption of the Army Sanitary Commission is obviously wrong. *See* Mr. Le Fanu's account of the complete disorganisation of the village communal service, and the absence of any one to bury the dead. The Tahsildar specially examined on this point states he does not know how many people fled, but described merely what he knew in regard to one village, *i.e.*, Kunathore. —W. R. C.

[2] I did not intend this as a 'statement,' because I did not inquire whither the fugitives had fled, or whether they carried cholera thither with them; I meant merely the natural consequences of infected persons moving to other quarters.—Dr. King.

[3] The taluk head-quarters, *Utankarai*, three miles away, had not a single case. —Dr. King.

From these remarks it would appear that the Army Sanitary Commission did not dispute the probability of contaminated water having played an important part in the diffusion of cholera, but the Commission object to the sufficiency of the evidence that the disease was imported into the village, and they seem to think that the condition of the village itself in regard to filth, in all probability, was sufficient to account for the outbreak.

It will be necessary therefore to review the evidence in regard to—

1. The condition of the village water-supply.

2. The sanitary state of the village when the outbreak occurred.

3. The facts in regard to the spread of cholera from Kankampatti to other villages.

Water-supply.—Dr. King's account of the matter is that the village had only one open well which received the surface drainage of the locality, including some of the filth of the village, that the people used this water not only for drinking but for washing their clothes and bathing. Further inquiry of the Tahsildar, a very intelligent native official, who was present during the epidemic, elicited the fact that the clothes of one of the strangers first seized with cholera were washed in this open well. He says, "a soiled cloth of one of the cholera patients was washed in the well, and as the inhabitants still continued to drink the same water, the Tahsildar ordered the discontinuance of its use." The change in the water-supply appears to have been accomplished on the morning of the 13th February, when the Tahsildar arrived in the village. Mr. Le Fanu on his arrival on the 17th repeated the Tahsildar's order in regard to the prohibition of this water, and more than a year subsequently, so fully had the lesson sunk into the villagers' minds, they had not resumed the use of the suspected water (*see* Venkata Suba Row's reply to Question 8 of the Sanitary Commissioner with the Government of India).

Mr. Le Fanu, in a communication dated 3rd December, 1878, remarks that the water of the well in Chinna Kankampatti which the villagers used after they had been warned about the danger of their own well, "was just as dirty as that at

Kankampatti." But the villagers of Chinna Kankampatti, who used that water habitually, escaped cholera, while the villagers of Kankampatti, only 200 yards distant, sustained a most virulent outbreak. This fact would seem to point to special contamination of the Kankampatti water. This water when chemically examined was found to be very impure and unfit for domestic consumption, and the probabilities are that as regards general impurities the well in Chinna Kankampatti was no better; but in the one case, cholera-infected clothing is proved to have been washed in the well, while as regards the supply of the neighbouring village, there is no evidence to show that the water had received any special cholera contamination. As far as the water-supply is concerned, it may be considered as proved that the water of the infected village was not only exceedingly foul, but that cholera discharges had actually been conveyed to the well by means of soiled clothing, if in no more direct way, and before cholera had seized on the inhabitants of the village.

Sanitary condition of Kankampatti.—The Collector, Mr. Longley, who got his information on this point direct from the Tahsildar, whom he met on business on the 15th February, distinctly states there was "nothing in the situation or exceptionally dirty state of the village" to account for the outbreak.

After visiting many hundreds or even thousands of villages in different parts of India, I may state that the following features are more or less common to all: (1), the wells or tanks are liable to constant pollution; (2), the conservancy is generally defective; (3), the outskirts of the village-site are used for purposes of nature; and (4), in all villages the surface pollution of the soil is increased by the practice of keeping cattle within the house inclosures. I have no doubt that the condition of Kankampatti as to cleanliness was very much that of the village alongside in which no case of cholera occurred.[1] Of every village in the country it may certainly be said that cleanliness of air, soil, and water are not regarded by the people as important to their well-being. It is in evidence that when the

[1] There was no exceptional insanitary condition when I visited, except the water-supply.—Dr. King.

Tahsildar arrived on the 13th February, active measures for cleaning and disinfecting were instituted, and it may be inferred that at the time there was filth and rubbish in the village; but the same inference might be correctly drawn in regard to all the villages of the country, whether cholera attacks them or passes them by. When Mr. Le Fanu arrived on the 17th he records that "the rubbish of the village had been burnt, and the backyards fairly cleaned." Dr. King, in inspecting the locality six months after the cholera outbreak, notices nothing unusual in the village, which he describes as "a group of huts placed without any attempt at regularity, and separated by very narrow tortuous lanes and small yards in which cattle are kept." If the village had been in an abnormal condition as to conservancy, so accurate an observer as Dr. King would not have failed to note it.

On the whole, I think it must be conceded that there was nothing special in the condition of the village, in comparison with other villages alongside, to account for nearly one-third of the inhabitants being stricken down by cholera within a few days. The simple fact that officials reporting the results of their observations contrast the condition of a hamlet not two hundred yards away with that of Kankampatti, without any special allusion to the dirt of one village or the cleanliness of the other, shows that there was nothing exceptional in the sanitary condition of the village.

Evidence of importation.—Further inquiry has elicited the fact that the people who are alleged to have taken cholera to the village of Kankampatti came from a village named Vengarahulli, in the Dharampuri Taluk. So far as can be ascertained from the village reports of cholera there was no epidemic in this particular village during the month of January, 1876, in fact the only cholera death in the village occurred in December, 1876. There was cholera, however, in twenty-one other villages of Dharampuri Taluk in that month. On the 1st February the travellers halted at a village named *Kallari* in the Utankarai Taluk. In connection with this movement it is important to note that in the cholera returns received in my office in January, 1876, two deaths are reported as occurring in the

village of Kallavi on the 28*th January*. The Tahsildar forwards letters from the Munsif of the village reporting a case on the 7th, and another on the 14th January in Kallavi; but neither of these cases are entered in the village list sent to my office. The Munsif of this village incurred the displeasure of his superiors for his carelessness in neglecting to make a report of cholera in his village, and was dismissed from office for neglect of duty in March, so that it is probable that other cases occurred in January which were unreported. The official returns show two cholera deaths in the village on the 28th January, 1876 (only fatal cases are included in the official returns), so that it seems quite clear that persons resting in this village on the 1st of February were inhabiting a locality in which cholera was, or had been recently present. The Tahsildar is quite satisfied that cholera actually prevailed in the village of Kallavi at the time the people halted in it. The party of travellers appear only to have rested at Kallavi on the 1st February; whether they took food or water there is not known; they passed on to Kankampatti the same night. On the 3rd February a *girl* of the party, according to the Tahsildar, (and a *man* according to the reports made to Dr. King six months later) was attacked with symptoms of cholera and recovered. The discrepancy in the evidence as to the sex of the persons first attacked is an immaterial point; but there can be no doubt, I think, that two of the party of travellers, a girl and a man, were attacked by cholera. From Dr. King's evidence it is clear that the second case occurred in the house in which the travellers were residing. It is important to note also, that, of the total number of cholera cases in the village, twelve, at the least, occurred in the house where strangers had assembled for a marriage ceremony, as Dr. King states that ten persons, other than the two cases that recovered, died. There were forty-eight houses or huts in the village, and the house in which the wedding preparations were in progress certainly appears to have had an undue share of cholera.

The evidence then is positive in regard to—

1. Importation of cholera by strangers recently arrived.

2. Excessive mortality amongst the persons brought into direct communication with the strangers.

3. Impurity of the village water-supply.

4. Special contamination of the village water-supply by cholera discharges.

Communication of Cholera to other Villages.—When cholera broke out in an unusually virulent form in Kankampatti, a panic seized the residents and many of them appear to have temporarily deserted the village; how many is not accurately known. The village headman (Munsif) was at one time the only official present, the toty having left, and there was no one to bury the dead. Mr. Le Fanu states that the head of the village (Munsif) took the dead bodies himself, on his head, to the burial-ground, but, there being nobody to bury them, the corpses were partially eaten by jackals, until the Tahsildar arrived on the 13th February and had them burned. When the chief resident of the village was compelled of necessity to do work so repugnant to his caste scruples, it is quite certain that the inhabitants must have been greatly demoralised by fear and panic, and that the temporary desertion of the village was greater than reported. In reply to a specific question by the Sanitary Commissioner with the Government of India, the Tahsildar states that only five[1] persons fled from the village to Kunathore, where three of them were taken ill and died. The two survivors returned to Kankampatti after the cholera had disappeared. But Mr. Le Fanu and the Tahsildar both report the flight of the village toty, and it does not appear that he was one of the four going to Kunathore, who were members of the village blacksmith's family. Mr. Le Fanu further reports "two villagers who got the disease fled to *Kallavi*, where they died, importing the disease with them."

So far as the evidence goes, therefore, it is certain that more than four people left the village, and the Tahsildar, in his explanation of the reply given to the Sanitary Commissioner with the Government of India, states that he meant that these were the persons that carried the disease to Kunathore. He

[1] This has since been corrected to four.

does not profess to know the number of people who temporarily deserted the village.

Importation of cholera to Kunathore.—The evidence in regard to this is complete. We know, as a fact, that up to the 7th February there had been no cholera in the village of Kunathore. The following translation of a letter from the village Munsif to the Tahsildar, dated 9th February, describes with clearness the facts in regard to the early cases of cholera in that village :—

"Sir,—I beg to report that blacksmith Pyachari, who came from Kankampatti, was attacked with cholera (vomiting and purging) on the night of the 7th February, 1876, and died on the morning of the 8th, at 7 o'clock, and also a boy named Ramasawmy, son of Pyachari, who came from the same village, was attacked on the same date and is recovering. Thonachari and Cunnesawmy, also from the same village, were attacked to-day (9th) with the disease, and are now suffering from it. I ordered the persons in their house to give them proper medicines."

If we turn to the village record of cholera deaths in Kunathore, we find corroboration of the Munsif's evidence in the clearest manner. The first death from cholera in the village was that of a stranger from Kankampatti, whose death is registered as occurring on the 8th February. The next death was registered on the 11th. The following table shows the cholera deaths in this village in February and March, 1876 :—

Month and Date.	Number of Deaths.		Month and Date	Number of Deaths.	
	Males.	Females.		Males.	Females.
8th February	1	...	26th February	2	1
11th ,, ...	1	...	28th ,, ...	2	2
13th ,, ...	1	...	2nd March	...	1
15th ,, ...	1	...	3rd ,, ...	1	...
16th ,, ...	...	1	4th ,, ...	...	1
19th ,, ...	...	2	7th ,, ...	1	...
20th ,, ...	...	2	8th ,, ...	1	...
21st ,, ...	...	3	9th ,, ...	1	...
22nd ,, ...	1	...	10th ,, ...	1	...
23rd ,, ...	1	4			
25th ,, ...	...	1			
			Total............	15	18

It will be noticed that all the earlier cases of deaths were of males, and two of these (at least) were persons from Kankampatti, and from the evidence it is clear that no fewer than four

persons from Kankampatti suffered from cholera after their arrival in Kunathore and desertion of their own village. It is equally clear from the evidence of the village registration that there had been no cholera in the village of Kunathore for many months before the arrival of the sick from Kankampatti, and that an outbreak followed, lasting until the 10th March, causing altogether thirty-three deaths in a population of 1,367. The evidence of importation, and of an outbreak following on importation in regard to this village, is, in my judgment, without a flaw.

Importation to Kallavi.—The evidence in regard to importation of cholera to Kallavi is defective. Mr. Le Fanu states "two villagers of Kankampatti who got the disease fled to Kallavi, where they died, importing the disease with them." No dates are given in regard to these cases, and we have already seen that cholera deaths occurred in that village on the 7th, 14th, and 28th January, that is, before Kankampatti was affected.

Turning to the village record of cholera mortality, I find the following entries in February and March, 1876, for Kallavi:—

Month and Date.	Number of Deaths.		Month and Date.	Number of Deaths.	
	Males.	Females.		Males.	Females.
4th February …………	1	…	19th February …………	1	1
5th ,, …………	2	1	20th ,, …………	…	2
6th ,, …………	…	1	21st ,, …………	…	3
8th ,, …………	…	1	22nd ,, …………	…	2
10th ,, …………	…	2	23rd ,, …………	3	…
11th ,, …………	1	…	25th ,, …………	1	…
13th ,, …………	1	3	26th ,, …………	1	…
14th ,, …………	1	…	4th March …………	1	1
15th ,, …………	3	…	5th ,, …………	1	…
16th ,, …………	3	…	9th ,, …………	1	…
17th ,, …………	4	1			
18th ,, …………	…	1			
			Total …………	25	19

There is no reason to question the fact that people going from Kankampatti died at Kallavi, as stated by Mr. Le Fanu, but as cholera already prevailed in that village when the Kankampatti villagers reached it, it cannot be said that the outbreak

in Kallavi was caused by importation from Kankampatti. There is no precise evidence to show that the re-importation of the disease by the two men alluded to by Mr. Le Fanu was the cause of the virulent epidemic in this village, in which forty-four deaths occurred in February and March out of a population of 358, but the Tahsildar and the people themselves were led to believe that the arrival of these strangers on the 4th February was in some way connected with the severe outbreak that followed. Owing to the absence of educated medical men in the country, the tracking of cholera from village to village, and the investigation of the circumstances under which it is exceedingly virulent in some villages, and less so in others, are beset with great difficulties. It is not often that the facts are observed by intelligent officials, as in the case of Kankampatti, but in regard to this village it seems to be well established that the disease was brought in by strangers, and that the special pollution of the water-supply was sufficient to account for the extreme severity of the outbreak. That the poison or contagium was localised is evident from the immunity of a village within two hundred yards of Kankampatti, and of the taluk chief town, inhabited by numerous officials and their families, three miles distant.

The character of these village outbreaks is well shown in the accompanying table of cholera deaths for the taluk of Utankarai in 1876. In nearly all these instances the village outbreaks were of short duration, not lasting more than a month or six weeks. In many instances the deaths were but few in number, while in other villages the mortality was very high. If it were possible to investigate the facts in every village, the results would doubtless bear a close resemblance to those ascertained in Kankampatti. In discussing the spread of cholera, it is fair to argue from the known to the unknown, and to conclude from long accumulated evidence that cholera is a disease capable of transport by human beings, and that its virulence in particular localities is determined in a great measure by the use of infected or contaminated water, or by other insanitary surroundings.

Return of Deaths from Cholera in the Villages of Utankarai Taluk, Salem District, during 1876.

Villages.	Population.	Months.												Total.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
Athikarapatty	784	...	...	...	...	...	...	...	...	...	...	...	8	8
Alathmarathahulle	363	...	1	...	...	...	...	...	...	...	...	...	2	3
Araloor	131	...	...	...	...	...	...	...	...	...	...	...	1	1
Ananthoor	1,497	...	...	13	...	...	...	...	...	...	...	...	...	13
Abbinaikampatte	190	1	2	...	...	...	...	...	...	...	...	...	...	3
Avoor	2,596	7	...	...	...	...	...	...	...	...	...	...	...	7
Barahully	184	...	...	...	...	...	...	...	...	1	...	...	...	1
Boinaikanhalle	441	...	...	...	...	...	...	...	...	...	...	32	7	39
Bundachettipully	649	...	...	...	13	...	...	...	8	2	...	...	2	25
Ettepatty	112	...	...	...	...	...	...	...	...	...	...	...	3	3
Erumiumputty	332	...	...	...	...	1	...	...	...	...	...	...	...	1
Elanthakottapatti	272	...	...	...	...	3	...	...	...	...	...	...	...	3
Eduvatty	613	...	...	...	2	...	...	...	...	...	...	...	...	2
Erumuthoor	352	...	...	..	1	...	...	...	...	...	...	1	...	2
Gollapulle	215	...	...	...	...	...	...	...	...	...	...	1	...	1
Gavoorapully	798	...	...	...	...	...	...	3	...	...	...	2	3	8
Gobmadapalle	317	...	...	...	...	...	...	...	...	...	...	18	...	18
Janasampatte	190	...	...	...	4	...	...	...	2	...	...	...	...	6
Kanakampatte	204	...	55	...	...	...	...	...	...	...	...	...	...	55
Kullavi	358	2	40	4	...	...	...	...	...	...	...	...	...	46
Kullumputty	120	1	...	...	...	...	1	...	...	...	...	...	...	2
Kurukumputty	369	21	...	...	...	...	...	...	...	...	...	...	...	21
Kongaraputty	560	21	...	...	...	...	...	...	...	...	...	...	...	21
Kangaperamputty	499	5	...	...	...	...	...	...	...	...	...	...	...	5
Kannaiyanalloor	1,425	...	1	...	...	2	...	...	...	...	...	34	14	51
Kunnathoor	1,367	...	20	8	...	...	1	..	...	..	...	...	...	29
Kottarapulle	192	...	...	4	...	...	...	...	...	...	...	...	...	4
Kindiganoor	106	...	...	...	1	...	...	...	...	...	...	...	...	1
Komlioor	417	...	...	...	1	...	...	...	...	...	...	...	...	1
Kathisattipalle	557	...	...	...	...	1	...	...	...	...	...	...	...	1
Kilaparai	480	...	...	...	...	...	5	...	...	...	...	...	...	5
Kedakerahulle	320	...	...	...	...	...	...	...	1	...	...	...	26	27
Kadathoor	1,127	...	...	...	...	...	...	...	1	...	...	...	...	1
Kottapatty	1,509	...	...	...	...	...	...	...	...	...	...	...	1	1
Kuppampatty	187	...	...	...	1	...	...	...	...	...	...	...	...	1
Ligurupatty	720	...	...	...	...	...	...	...	...	...	...	...	2	2
Murukumpatty	135	...	...	...	...	...	...	...	...	...	...	4	5	9
Mallasanudram	186	...	...	...	...	...	...	...	...	...	...	...	10	10
Mollapully	323	...	...	...	...	...	...	...	...	...	...	1	...	1
Monjavadi	557	...	...	...	...	3	...	...	...	...	...	...	...	3
Mullumpatty	246	...	...	...	1	...	...	...	...	...	...	...	...	1
Mallapurum	182	...	...	...	2	...	...	...	...	...	...	...	...	2
Manasi	1,436	...	7	...	...	...	...	...	...	...	...	...	...	7
Mamputtee	481	1	2	...	...	...	...	...	...	...	...	...	...	3
Mittapully	664	2	...	...	...	...	...	...	...	...	...	...	...	2
Maramputty	327	1	...	...	...	...	...	...	...	...	...	...	...	1
Naikauoor	496	...	...	...	1	...	...	...	...	...	...	...	...	1
Nariamputty	86	1	...	...	...	...	...	...	...	...	...	...	...	1
Narisamputty	240	10	...	...	...	...	...	...	...	...	...	...	...	10
Nayaperamputty	196	2	...	...	...	...	...	...	...	...	...	...	...	2
Nallamputty	149	3	...	...	...	...	...	...	...	..	...	...	...	3
Naralapattu	206	...	...	...	...	15	...	1	...	...	...	...	...	16
Nadupattu	288	...	...	...	...	...	1	...	...	...	...	...	...	1
Carried forward	26,749	78	128	29	27	25	8	4	12	3	...	93	84	491

Villages.	Population.	Months.												Total.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	
Brought forward......	26,749	78	128	29	27	25	8	4	12	3	...	93	84	491
Nadooputtoo	401	...	...	...	...	...	...	...	...	3	...	...	...	3
Narippatty	544	...	...	...	...	...	...	...	...	...	...	...	12	12
Olappatty	90	...	...	...	1	...	...	...	...	...	...	...	...	1
Oddappatty	321	...	3	...	...	...	...	...	...	...	...	...	...	3
Pallipatty	780	10	...	...	...	1	...	...	...	...	...	...	2	13
Pasarahulle	184	...	...	...	...	...	...	...	...	...	...	...	22	22
Pillaparuthee	532	...	...	...	4	...	...	...	...	...	...	...	9	13
Parayaputty..............	698	...	...	...	...	5	...	...	...	...	...	1	1	7
Polieru	217	...	...	...	...	...	...	...	...	...	...	...	11	11
Pamaudaputte	66	...	1	...	...	...	...	...	...	...	...	1	...	2
Paroomanthully	325	...	...	...	...	...	...	...	...	...	...	2	...	2
Pasuvapuram	524	...	...	...	...	...	1	...	1	...	...	...	...	2
Padathasamputte	138	...	2	...	...	...	...	2	1	...	...	...	...	5
Puthupatty	687	...	...	...	...	...	5	...	...	...	...	...	...	5
Pommady	1,189	...	...	...	...	...	1	...	...	...	...	...	...	1
Pathuramputte	605	...	...	...	...	8	...	...	...	...	...	...	...	8
Paraippatte	461	...	...	4	...	...	...	...	...	...	...	...	...	4
Pennamarathapatti	360	...	3	1	...	...	...	...	...	...	...	...	...	4
Perumanaikanpatte	125	...	1	...	...	...	...	...	...	...	...	...	...	1
Panakul....................	514	4	...	...	...	...	...	...	...	...	...	...	...	4
Padaputty.................	351	2	...	...	...	...	...	...	...	...	...	...	...	2
Parathalaputty	172	1	...	...	...	...	...	...	...	...	...	...	...	1
Reudathampatte.........	43	4	...	...	...	...	...	...		...	...	...	...	4
Ramakistnampulle......	232	4	...	...	...	...	...	...	...	...	...	...	1	5
Ramapurum..............	261	...	...	...	...	...	...	...	...	...	...	1	...	1
Soviamputty..............	158	2	...	...	...	...	...	...	...	...	...	...	...	2
Simaguraputte...........	645	31	...	...	...	...	...	...	...	...	...	...	...	31
Sarahully	184	1	...	...	...	...	...	...	...	...	...	...	...	1
Settilengi	402	...	...	11	7	...	...	...	...	...	...	...	...	18
Soolakarai.................	600	...	...	...	...	1	...	...	...	...	...	...	...	1
Salamarathupalle	681	...	...	...	...	...	...	1	...	...	...	...	...	1
Soonnalamputty	251	...	...	...	...	...	...	..	1	...	...	...	...	1
Sengeehully	212	...	...	...	...	...	...	...	...	...	...	10	2	12
Santhiraputty............	446	...	...	...	...	...	...	...	...	...	...	...	4	4
Sennakavundamputty..	356	...	...	...	...	...	...	...	...	...	...	...	19	19
Selamba....................	119	...	...	...	...	...	...	..	...	...	...	...	1	1
Thasarahully	555	...	...	...	...	...	...	...	...	...	...	...	5	5
Terunanaputty	733	...	...	...	...	...	...	...	...	...	...	6	...	6
Taneepundal..............	22	...	...	...	...	...	...	...	...	...	...	1	...	1
Tippumputty	187	...	...	...	...	...	...	...	...	...	...	1	...	1
Thaggaraputty...........	562	...	...	...	...	...	...	...	...	12	...	...	...	12
Thalnatham	719	...	...	...	...	15	8	...	5	...	...	...	...	28
Themdegapanur	349	...	...	...	13	...	...	...	...	...	...	...	...	13
Tokandahulle	346	...	7	...	...	...	...	...	...	...	...	...	...	7
Utankarai	1,398	...	...	...	1	...	...	...	...	...	...	...	...	1
Upparaputty	276	1	...	...	...	...	...	...	...	...	...	...	...	1
Verasikuppum	389	...	8	...	...	...	...	...	...	...	...	...	...	8
Velanoor	569	...	...	6	5	...	...	...	...	...	...	...	...	11
Venakambady	91	...	...	...	1	...	...	...	...	...	...	1	...	2
Verinputty	660	...	...	...	...	...	...	...	...	...	...	2	...	2
Vagoothaputty	720	...	...	...	...	...	...	...	...	...	...	8	...	8
Velampatty	315	...	...	...	...	...	...	...	...	...	...	...	4	4
Total...............	48,517	138	153	51	59	55	23	7	20	18	...	127	177	828

Additional Note.

Since the foregoing narrative of events in the Salem District was written, Surgeon-Major G. W. Ogg, Civil Surgeon of Coimbatore, has brought to my notice a parallel instance of a village cholera outbreak, the facts of which were investigated by himself in 1877, and noted in the Civil Dispensary report for that year.

In this instance, as at Kankampatti, the village was a small one, and one-half of the inhabitants were in a few days prostrated by cholera. As at Kankampatti, the fact of the contamination of the village well by washing the soiled clothing of cholera patients was clearly proved, and on the discontinuance of this source of water-supply cholera diminished in frequency and fatality. In Dr. Ogg's example, it is important to note that the sanitary condition of the village at the time of outbreak was better than the ordinary run of Indian villages. The village itself was on high ground and kept clean, but its drinking water-supply was specially contaminated by washing of infected clothes. In this village no direct importation could be traced, but cholera prevailed at the time in the town of Coimbatore, a few miles distant, and in other villages of the same registration circle.

The following is Dr. Ogg's statement in his Annual Report for 1877:—

"The outbreak of cholera reported from some parts of the district has been characterised by unusual virulence.

"As an instance in point, I may mention an epidemic that occurred at a place called Madathoor, a few miles from Coimbatore. In this small village, containing only about 100 inhabitants, more than half were attacked and a third carried off by an outbreak of cholera in February and March (36 persons died between 24th February and 7th March). The first case occurred on the 24th February, and in 48 hours 32 of the inhabitants had been attacked with cholera, of whom 20 died. The occurrence of the outbreak was reported to me on the 27th February, and the same day a Hospital Assistant was despatched to Madathoor with a supply of medicines. On his arrival this medical subordinate found the villagers washing the clothes of cholera patients in a large well from which all the inhabitants obtained their supply of drinking water. This well was at once closed and water obtained from an uncontaminated source (not far distant). From this time, although cholera continued to linger in the village for some weeks, it showed none of the virulence of the original outbreak, the type of the disease being comparatively mild and the percentage of mortality small. From 27th February to 9th March 27 cases occurred with only 8 deaths. On visiting Madathoor during the progress of this epidemic I found the place unusually clean for a native village, built on a high open site with excellent natural drainage, and nothing in the surroundings or sanitary arrangements to account for so virulent an outbreak of cholera. The importation of the disease could not be traced, the

first person attacked having been a ryot who had not been absent from his village for some time, and who had not, so far as could be ascertained, come in contact with any source of cholera contagion. At the time of my visit (on 6th March) nearly every house in the village contained a patient suffering from cholera, as the villagers could not be induced to segregate the sick or to remove them to a shed built for a cholera hospital. Nevertheless the disease died out rapidly, and from the time the infected well was closed the virulence and high mortality which had marked the outbreak at its commencement abated at once."

I have dwelt on the details of these epidemics because it is only in cases like the above, where a sudden outbreak of cholera occurs in a small and comparatively isolated community, that facts can be obtained from which inferences of some cogency can be drawn as to the origin and spread of cholera. The history of the Madathoor epidemic may, I think, be regarded as bearing strong corroborative evidence in favour of the view that water polluted by the discharges of cholera patients forms by far the most potent of the exciting causes of the disease, and that in the great majority of cases in which a sudden and virulent outbreak of cholera affects a limited number of persons, a polluted water-supply will be found to be the *fons et origo mali.*

15*th August*, 1879.

ARSENICAL POISONING BY MEANS OF WALL-PAPERS, PAINTS, ETC.

[THIS subject is not only one of great importance, but one whose importance would appear not to be fully recognised even by the medical profession. We therefore print in full a report presented to the Medical Society of London on the part of a Committee of the Society, by Malcolm A. Morris, M.R.C.S. Eng., Secretary to the Committee; and we trust that our readers will do what they can to assist in collecting sufficient evidence to bring the evil convincingly before Parliament.—ED.]

In submitting the following report your Committee have to express their regret that the appeal for professional information on the subject of arsenical poisoning by means of wall-papers, paint, articles of furniture, &c., has not met with more general response. This is doubtless mainly attributable to the fact that the attention of medical men has only recently been directed to the subject, in which case the publicity that has been given to

this inquiry will have the effect of ensuring more minute observation of these cases in the future.

The report will be found to be based upon replies, to the number of two hundred and twenty-four, which have been received as the result of the issue of fifteen hundred circulars addressed to the Fellows of the Society and other members of the profession. The circular took the form of the following questions:—1. Have you had under your observation, during the last five years, any cases clearly traceable to arsenical poisoning, produced by wall-papers, paint, articles of furniture, or wearing apparel, &c.? 2. Any cases previous to that time? 3. What were the first symptoms that led you to suspect this form of poisoning? 4. State briefly the prominent characteristics of each case. 5. Were there any external symptoms of irritation? 6. How long was it in each case before the patient recovered health and strength? 7. Were any cases fatal? 8. What article contained the poison? What tests were employed to detect its presence? 9. How many cases occurred in men? How many in women? How many in children?

In their replies to these questions, only fifty-four of the two hundred and twenty-four correspondents were able to afford particulars of cases of poisoning by this agent that had come under their personal observation, but their remarks have reference to more than one hundred cases.

A most important feature in this testimony is that no fewer than twenty-four instances of the poisoning occurred in the persons of the medical men themselves, or in members of their families, which, in the first place, is very strong evidence of the difficulties attending the diagnosis of this form of poisoning, and, secondly, tends to show that the better opportunities for observation afforded to a medical man in his own house may lead to the detection of mischief which, from its insidious nature, baffles ordinary tests, or, by assuming symptoms of a general character, is often erroneously treated as indicating a different class of ailments.

The following cases have occurred in the houses of medical men:—

CASE I.—"For more than a year," writes a practitioner of eminence, "my own wife suffered repeated attacks (one of great severity) of enteritis. The patient was in the habit of sitting

the greater part of the day in a room papered with green paper. Without any reference to the symptoms, the paper was accidentally changed to another colour. It was noticed by me afterwards that the symptoms had disappeared. It then occurred to me that it might be due to the green pigment, and, on testing a piece of the old paper, I found abundance of arsenic."

CASE II.—A physician and his wife suffered from conjunctivitis and from nausea after food. On the arrival of a relative, who soon was attacked in a similar manner, the cause was traced to the drawing-room paper, which contained arsenic.

CASE III.—A distinguished consulting surgeon lost two children from enteritis. The cause of the illness was a mystery until after their death, when the nursery-paper, the pattern of which was a fuchsia, leaves and blossom on a brown ground, was found to contain arsenic.

CASE IV.—A medical man and wife suffered from headaches, nausea, and conjunctivitis, all of which were worse early in the morning. The symptoms abated when the bedroom paper was removed. It contained arsenic.

CASE V.—A surgeon suffered severely for several days from extreme depression, diarrhœa, griping, and asthma at night; and his wife some days afterwards being affected with similar symptoms, the paint of the sitting-room was suspected by the physician in attendance. It was found to contain a large quantity of arsenic.

CASE VI.—A consulting physician had a severe attack of enteritis, with hæmorrhage and great prostration. All the symptoms disappeared on the removal of the paper of his study. It contained a large amount of arsenic.

CASE VII.—A physician, in reporting his own case, says he had "intense cephalalgia, conjunctivitis with intolerance of light, great depression, loss of appetite with gastric irritation—worse when using the study, the wall-paper of which contained arsenic."

CASE VIII.—A physician says he suffered from griping, constipation, and headache for more than two years. He noticed that the symptoms were worse on entering the dining-room in the morning after it had been closed during the night. "I soon recovered on the removal of the cause." The dining-room paper contained arsenic.

Case IX.—A consulting physician and his wife both suffered from restlessness, loss of sleep, malaise, and headache. The symptoms lasted a fortnight, but disappeared when the bedroom paper was removed. This was proved to contain arsenic.

Case X.—A surgeon says that his wife, child, and himself had irritable cough, accompanied by wakefulness, restlessness during sleep, and irritation of the eyelids. All the symptoms disappeared in a week or ten days after the removal of the bedroom paper, which contained arsenic.

In the remainder of the cases reported, diarrhœa, nausea, and intestinal mischief occurred in thirty-five; severe depression in sixteen; conjunctivitis in nineteen; and cough, asthma, &c., in nine. Several instances of external irritation are mentioned, such as eczema from stockings and gloves, conjunctivitis from tulle dresses, eczema of the head from artificial flowers, &c.

It should be remarked that the foregoing statements have not emanated, by any means, exclusively from men having preconceived notions of the value of careful investigation in such circumstances. The conclusions arrived at by them have been forced upon them by stern necessity as the only solution of the enigma, and in many cases in direct opposition to their own *à priori* judgment and previous opinions. They are men, many of them standing high in the profession, whose opinions should carry weight with their colleagues; and it follows that if only after much careful watching and by a process of exhaustion or exclusion they were able to determine the real sources of the evil, there must be a vast amount of information yet to be obtained when time and a better knowledge of this subtle poison and its workings shall have brought the profession to unite their efforts to sift and study the matter. As an illustration of the difficulty of tracing the symptoms to their actual source, no stronger fact could be adduced than that so large a percentage of patients were in the houses of the medical men themselves, and so directly and constantly under their scrutiny; and this seems to indicate that exceptional facilities are necessary to the discovery of the evil. Not only must the symptoms be watched and tested, but every article that suggests an explanation must be suspected. The occurrence and recurrence of the mischief under certain conditions will often lead to its detection. But

as all these precautions involve much labour and assiduous attention, it is too much to expect them to be employed except by those who possess both the knowledge and the determination necessary to support them in their search, and an earnest desire to cope with a somewhat impalpable antagonist.

As to the articles referred to, thirty-six medical men report that they have observed cases of poisoning clearly due to arsenic in paper, five in paint; while several others have traced its presence in stockings, wearing apparel, artificial flowers, bedsteads, and toys.

Your Committee have come to the conclusion that the time has arrived when some check should be imposed upon the free and unrestricted sale of poisoned articles before mentioned, with a view to making it compulsory that such articles should be advertised as containing deleterious matter, in order that purchasers might at least be aware of the danger they were incurring in their use.

But before taking any steps with regard to legislation in the matter, your Committee are of opinion that some further effort might be made to obtain some more general expression of opinion from the profession, who, it may be, will, after reading this report, make more careful and fuller notes of any appearances of poisoning from arsenical compounds, and thus place at your Committee's disposal, at some not very distant period, a crushing and incontestable weight of evidence which could with confidence be brought under the notice of Parliament.

EDWARD CATOR SEATON, M.D., F.R.C.P.

Edward Cator Seaton, M.D., F.R.C.P., who died on the 21st January, was born in 1815, and graduated at the University of Edinburgh in 1837. He entered the public service in 1859 as a medical inspector attached to the Privy Council Office, was transferred with the medical department of that office to the Local Government Board on the formation of that administrative body in 1871, became Assistant-Medical Officer of the Board, and succeeded Mr. John Simon, C.B., as Medical Officer, on the retirement of that gentleman in 1876. Dr. Seaton resigned this appointment at the close of 1879 in consequence of an attack of paralysis (right hemiplegia) which had occurred in the autumn. A second attack (left hemiplegia), which took place in the third week after his resignation, brought his life to a close. Very soon after he had entered upon his professional career Dr. Seaton's attention was given to the insufficiency of the arrangements for vaccination, then optional, existing in the kingdom; and from that time to the date of his retiring from official work

this subject may be said to have chiefly occupied his care. He co-operated with others in the formation of the Epidemiological Society, and induced that Society to undertake, as one of its earliest works, an investigation concerning the influence of vaccination in limiting the prevalence of small-pox, and the public provision for vaccination as observed, not only in this country, but in various countries of the Continent. The report of the Committee of the Society appointed to conduct this investigation, prepared by Dr. Seaton, was communicated to the Government and submitted by them to Parliament, by whom it was directed to be printed. This report exercised an important influence in strengthening the hands of the promoters of the Vaccination Act of 1853, by which the vaccination of infants was made compulsory; and subsequently in contributing to the passing of certain sections of the Public Health Act of 1858, by which certain powers, previously exercised by the Poor Law Board for the regulation of vaccination, were transferred to the Privy Council. After his entry into the public service Dr. Seaton was occupied for several years, almost entirely, with a survey of the state of vaccination in the kingdom. In this extended survey, in which he was assisted by others, he obtained that unequalled knowledge of the requirements for an efficient public vaccination which enabled him, in conjunction with Mr. John Simon, to bring the public arrangements for vaccination to the degree of completeness which now exists. It was the intimate knowledge, gathered from this prolonged and exhaustive survey, which rendered possible the Vaccination Act of 1867 and the Amending Act of 1871. By these acts vaccination from arm to arm—the only thoroughly efficient mode in which vaccination can be certainly performed, when humanised lymph is in question—was made practicable in the public-vaccination to be performed throughout the kingdom; and an organisation was effected by which the births of all children registered should be accounted for in the vaccination returns. For the first time, in fact, since the discovery of vaccination, it became possible, after the passing of these Acts, to extend adequately the blessing of Jenner's immortal work to the population at large of this kingdom. This extension constituted the chief labour of Dr. Seaton's life, and to him we are mainly indebted for it. Much as Dr. Seaton was occupied with work as to vaccination, it would be an error to assume that it entirely absorbed him. He was an exceedingly judicious administrator in all matters concerning the public-health service of the country, and did excellent occasional general sanitary work during his long connection with the public service. In 1874 he was one of the delegates of the British Government at the International Sanitary Conference held in Vienna, which had been summoned with particular reference to the question of protecting Europe against cholera. His official memoranda concerning this conference, and questions connected therewith, are among the most valuable of the public-health memoranda which have been prepared in the Medical Department of the Local Government Board. Except official reports Dr. Seaton wrote little. His best known works, outside of what he penned officially, are the article on "Vaccination" in *Reynolds's System of Medicine*, and a *Hand-book of Vaccination*, which will long remain the standard work on the subject.

ERRATA.

Two errors stole into Dr. Ballard's article on Animal Vaccination in our number for February.

P. 145, third line from bottom, *for* "leg," *read* "by."

P. 146, first line, after 97·8, *add* "per cent."

THE PRACTITIONER.

APRIL, 1880.

Original Communications.

CITRATE OF CAFFEIN AS A DIURETIC.

A PAPER in the *Practitioner* for January, 1879, by Dr. Shapter, led me to try the effects of citrate of caffein as a diuretic in various forms of dropsy, and as I am satisfied of its value I wish to put on record my experience of its use. I only report cases in which the effects of caffein were watched fully, and in which the amount of urine secreted was ascertained with fair accuracy. Many instances both of its success and failure are excluded, because the results could only be obtained in loose, and therefore not quite reliable, terms. The cases in which the drug was used without success are recorded, because in testing the value of a comparatively new remedy it is almost as important to chronicle failures as successes. It should be borne in mind, however, that in several instances the citrate was tried almost as a forlorn hope.

I may say that in administering citrate of caffein I gave it uncombined, and that unless the presence of causes tending to alter the quantity of urinary secretion, such as diarrhœa, be noted, they were absent. Moreover, I always waited to see the effects of rest and warmth in bed for several days before prescribing

the drug, and only gave citrate of caffein when no amendment appeared, or having begun, had ceased. But for this precaution two or three more instances of the beneficial effects of caffein would probably have been recorded. I have tried caffein in dropsies, of cardiac, renal, hepatic and peritoneal origin.

It was in dropsy, sequential to heart disease, that citrate of caffein was found beneficial by Gubler, and Shapter's good results from its use were obtained in cardiac cases. I have given it in seven instances of cardiac dropsy, and in four its effects as a diuretic have been evident. In a fifth the cardiac disease was very advanced, though the dropsy was slight; here no good result was obtained. Nor was it of service in the sixth case, where the heart disease was accompanied by chronic renal changes apparently of independent origin. In the seventh its gastric effects seem to have prevented its efficacy.

Case I.—G. J. was admitted into the Infirmary on the 7th of January, 1879. After suffering some years from palpitation he noticed that his legs began to swell. This was nine months before he came under my care, and twice during this period he had been in hospital for anasarca and ascites, which had partially disappeared under treatment but quickly returned. On admission the legs were very œdematous, the abdominal cavity contained much fluid: the size of the liver could not be ascertained.

The ordinary signs of aortic and mitral incompetence were present, and both the right and left cavities of the heart were hypertrophied and dilated. Dry and moist rhonchi were heard all over the chest, the pulse was of fair strength but somewhat irregular, the urine scanty but free from albumen. After rest in bed for two days he seemed somewhat better, and his pulse became regular.

The following table, which I have compiled from notes taken by my clerk, Mr. Scarth, shows the treatment adopted and the results obtained:—

Date.	Amount of urine in ounces.	
Jan. 12	17	(Girth 40 inches.)
13	13	Tr. Digitalis, ♏ x. } ter in die.
14	16	Liq. Fer. Perchl., ♏ x. } ter in die.
15	15	
16	17	

Date.	Amount of urine in ounces.	
Jan. 17	15	Pulv. Scammonii Co. gr. xxv. hora somni.
18	14	(Freely purged.)
19	16	(Freely purged.)
20	22	Tr. Digitalis, ♏ x.
21	28	Pot. Cit. gr. xv. } ter in die.
22	17	Decoct. Scoparii, ℥ j.
23	18	(Purged with Scammony powder.)
24	18	,, ,, ,,
25	22	,, ,, ,,
26	40	
27	20	
28	14	Resina Copaibæ, gr. ix. tertiis horis.
29	18	(Freely purged.)
30	22	
31	31	(Girth 41 inches.)
Feb. 1	20	
2	20	
3	24	
4	15	Spt. Juniperi, f. ʒ j. quartis horis.
5	15	
6	21	
7	18	
8	17	
9	21	Sodæ Bicarb. gr. x. } ter in die.
10	17	Infus. Calumbæ, ℥ j.
11	14	
12	25	(Girth 42½ inches.)
13	55	
14	74	Caffein Citras, gr. iij. tertiis horis.
15	65	
16	66	
17	42	
18	41	Caffein partially stopped.
19	27(?)	
20	43	
21	52	
22	80	
23	61	Caffein Citras, gr. iij. tertiis horis.
24	81	
25	56	(Girth 39 inches. Œdema almost gone.)
26	26	Caffein given irregularly, owing to headache and cardiac pain.
27	17	
28	19	
March 1	22	
2	40	
3	47	
4	65	
5	42	
6		
7	36	Caffein Citras, gr. iij. tertiis horis.
8	24	
9	34	
10	54	
11	20	(Diarrhœa.)
12	15	
13	24	
14	24	
15	22	
16	10	Copaiba resumed.
17	21	

Date.	Amount o urine in ounces.	
March 18	14	
19	18	
20	18	Caffein resumed
21	16	
22	20	
23	24	
24	15	Vapour baths. No medicine.
25	15	
26	14	
27	17	
28	22	
29	23	
30	26	
31	42	Caffein resumed
April 1	36	
2	30	
3	23	
4	25	
5	14	

The effect of citrate of caffein in this case was very distinct. Digitalis first combined with iron, afterwards with citrate of potash, had failed to do good, nor had watery purgatives given relief. Copaiba and juniper were equally unsuccessful. Until he commenced with caffein, on the 12th of February, the patient had gradually been getting worse. At this time he suffered from orthopnœa, palpitation, and sleeplessness. The œdema of his legs, scrotum, and back was very considerable, and the abdominal girth was two inches and a half greater than on admission five weeks previously.

On the 15th of February, after he had taken caffein three days, I find the following note, " Much better, sleeps well, not so much cough or orthopnœa, pulse 76, moderately strong and regular." On the 17th he was very much better, legs, scrotum, and back being less œdematous. On this and the following two days the supply of caffein fell short, and for the next three days he only took about six grains in the twenty-four hours. The effect of the diminution of the dose on the urinary secretion was very distinct: the quantity was lessened by about a pint daily. On the 20th the full dose of caffein was resumed, and the amount of urine passed rose to above four pints. Both anasarca and ascites rapidly lessened. On the 26th of February cardiac pain running to the right shoulder and abdomen, palpitation, and severe headache, which the man thought was aggravated by the caffein, led to its irregular administration, but an accurate record was

not kept of the amount taken. The cardiac symptoms were due to pericarditis. No friction-sound, however, was at this time observed, but a considerable increase in the area of the heart's dulness occurred. When the caffein was resumed in full doses on the 1st of March, the quantity of urine again increased, though not to such an extent as before. The man, however, was at this time suffering from much cardiac pain and oppression, and the pulse was more irregular than it had hitherto been. On the 7th of March he got cold, his bronchitis became much worse, the pericardial effusion increased, and caffein ceased to be effectual, the quantity of urine only once rising above fifty ounces after this date. From this time to his death, on the 30th of April, no remedial agent seemed to benefit him. Copaiba was again used, and citrate of caffein on two occasions, the first time without showing any diuretic power, the second time increasing for a few days only the quantity of water excreted.

Many plans of treatment were subsequently tried, but all failed to increase the urinary discharge or give relief. A trace of albumen was found in the urine during the last few days of life.

In the report of the post-mortem it is stated that the walls of the heart were hypertrophied but healthy, the healthiness however was not verified by a microscopic examination. The pericardium was full of fluid, the lymph deposited on the cardiac surface was small in amount. The aortic and mitral valves were incompetent. There were evidences of old perihepatitis, but the liver, though congested, was of normal size.

Case II.—C. L. became a patient at the Infirmary on the 3rd of May, 1879, with mitral incompetence, cardiac hypertrophy, and dilatation, bronchitis, ascites, and anasarca. The cardiac disease seemed to date from an attack of rheumatic fever seven years previously. During the last three years he had suffered four times from anasarca. On the last occasion the scrotum sloughed away. The legs, arms, and back were extremely œdematous, the abdomen was full of fluid, and the urine contained a considerable amount of albumen. The pulse was weak and very irregular, the patient could not lie down in bed; a more unpromising case could hardly be submitted to treatment.

The following table, however, shows that for a short time at least citrate of caffein appeared to have the effect of promoting

the urinary flow and relieving the more urgent symptoms when other means failed :—

Date.	Amount of urine in ounces.	
May 6	22	
7	18	Tr. Digitalis. } ter in die.
8	32	Pot. Citras.
9	44	Liq. Ferri Perchl.
10	40	(Legs punctured.)
11	36	
12	37	
13	32	Pulv. Jalapæ Co. gr. 40.
14	38	(Several watery motions.)
15	33	
16	30	
17	32	Potassii Iodi. gr. v. ter in die.
18	36	
19	29	
20	34	
21	51	Caffein Citras, gr. iij. tertiis horis.
22	68	
23	88	
24	97	
25	43	
26	57	No medicine.
27	28	
28	25	
29	36	
30	34	
31	27	
June 1	29	Caffein Citras, gr. iij. tertiis horis.
2		
3	20	

The digitalis mixture and the iodide of potassium did not mitigate the symptoms, though the former seemed to increase somewhat the amount of urine secreted. On citrate of caffein being substituted for iodide of potassium the quantity of water at once increased largely.

During the four days he took the drug the abdomen decreased an inch in girth, the right thigh three inches, and the left two and a half inches. The œdema disappeared from other parts of the body in the same proportion, and he felt decidedly better. But he began to suffer from headache with slight sickness, and a feeling of confusion. He had not noticed these symptoms before, and they ceased when the medicine was discontinued. As the quantity of urine fell to twenty-eight ounces on the fourth day after the medicine was stopped, the caffein was again given, but this time without producing an increased urine flow.

It did not, however, cause any headache. Though the quantity

of urine passed was below normal and contained much albumen, the anasarca for a few days continued to decrease—but only for a few days. Both anasarca and ascites soon became much more troublesome. All diuretics failed, and paracentesis twice performed only prolonged life to the 21st of July. At the sectio the mitral orifice was found constricted; the heart greatly hypertrophied, weighing twenty-three ounces; the right cavities were enormously distended. The thickened walls of the left ventricle are stated in the report of the post-mortem to present no evidence of structural degeneration, but the coronary arteries were calcified in places. The enlarged liver was surrounded by a thickened capsule, and the kidneys presented the ordinary appearances of prolonged passive congestion.

Case III.—O. P., aged 17, was sent into hospital from the out-patient department on the 22nd of October with mitral and aortic incompetence, a greatly enlarged heart, considerable ascites, and some anasarca. The day after his admission a pericardial friction-sound was heard, and evidence of effusion into the pericardium appeared on the 24th; the anasarca was then less marked than on admission, but the urine continued scanty; the pulse was feeble but regular.

Under digitalis the boy improved a little; the quantity of water passed increased, but after taking it six days he had still some œdema of the feet, the ascites was unchanged in amount, the pericardium contained fluid, and considerable effusion into the left pleural cavity had occurred; the pulse had not improved much in character. On the 29th of October, caffein citrate in three-grain doses was given. The comparative effects of digitalis and caffein are seen in the table which follows.

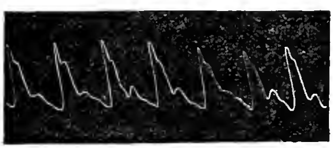
Date.	Amount of urine in ounces.	
Oct. 24	15	Tr. Digitalis, ℳ viiss. quartis horis.
25	24	
26	15	
27	24	
28	34	
29	27	
30	40	Caffein Citras, gr. iij. tertiis horis.
31	44	
Nov. 1	37	(Diarrhœa.)
2	46	
3	82	
4	83	(Purged four times.)
5	72	

Date.	Amount of urine in ounces.	
Nov. 6	26	(Purged three times.)
7	32	
8	48	
9	26	Liq. Ferri. Perchlor. ♏ x. ter quotidie.
10	28	
11	46	
12	56	

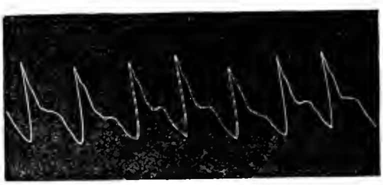
The boy improved very rapidly as soon as diuresis was established. On the 6th of November the anasarca and ascites had disappeared, and evidence of fluid in the pericardium was wanting. A little effusion in the left pleural cavity could be detected. He stated that he felt very much better, but complained of nausea after taking the medicine. He did not suffer from headache.

The effect of the citrate of caffein on the circulation is shown by the pulse tracings taken by my clerk, Mr. Harris, who reported the case.

O. P., Oct. 29th.



O. P., Nov. 1st.



The anasarca and ascites have not returned up to this date (February 10th), though the boy has been doing light work since his discharge on the 6th of January, 1880. His stay in hospital was prolonged owing to the occurrence of an attack of right pleurisy with slight effusion.

Case IV.—J. C., aged 20, admitted into the infirmary on the 5th of January, 1880, with an incompetent aortic valve and a narrowed and incompetent mitral orifice referred his cardiac troubles to exertion at football some two years ago; but the occurrence of subacute rheumatism during his stay in hospital renders it probable that rheumatic endocarditis is the cause of his valvular changes. Though he had suffered from palpitation, shortness of breath, and other symptoms pointing to a con-

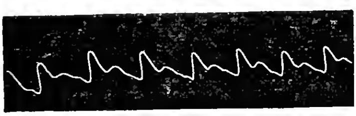
siderable cardiac lesion for two years, it was not till six weeks before admission that his legs began to swell. When he came into hospital he had œdema of the feet, ascites, an enlarged liver, reaching below the umbilicus, a slightly jaundiced appearance and orthopnœa, with palpitation on the slighest exertion. The position of the apex-beat in the sixth space outside the nipple line and the sharp flapping beat over a large area of superficial cardiac dulness pointed to dilatation. The pulse was very weak and irregular. Sonorous rhonchi could be heard all over the chest; the urine was scanty, but contained no albumen. A week's rest in bed without medicine increased the urine flow from fourteen to sixteen ounces on the first two days of admission, to twenty-six and thirty on the seventh and eighth; the œdema almost disappeared, the ascites lessened slightly, but the palpitation and dyspnœa continued. A further trial for seven days of the expectant treatment brought no further improvement. As long as he remained in bed no œdema could be detected, save a little in the back, but as soon as he began to get up the œdema reappeared. The pulse became weaker and more irregular, so that a tracing could not be taken. On the 23rd of January, sixteen days after admission, three grains of citrate of caffein was ordered three times daily. On the 25th no improvement was noticed, but on the evening of the 25th he began to take three grains of the drug every three hours, that is, twenty-four instead of nine grains daily. The following table, compiled from notes taken by my clerk, Mr. Richmond, appears to show the diuretic properties of the caffein:—

Date.	Amount of urine in ounces.	
Jan. 7	14	No medicine.
8	16	
9	20	
10	18	
11	20	
12	22	
13	26	
14	24	
15	26	
16	30	
17	28	
19	25	
20	24	
21	30	
22	34	

Date.	Amount of urine in ounces.	
Jan. 23	30	Caffein Citr. gr. iij. ter in die.
24	24	
25	36	Caffein Citras, gr. iij. tertiis horis.
26	70	
27	36	No medicine.
28	48	
29	49	
30	36	
31	16	
Feb. 1	28	

The caffein was taken during the 25th and 26th, but discontinued early on the morning of the 27th on account of intense headache and gastric disturbance, which it seemed to have caused. The pain in the head was continuous, specially severe over the right temple, and described as of pressing constrictive character. He had never experienced a similar headache before. His appearance betokened the severity of the pain he suffered; it continued all day, and he vomited frequently, bringing up thin

Jan. 28th.



Jan. 7th.

liquid of a green tinge. He took no food and drank very little. The least movement brought on vertigo.

No medicine was administered, but next day the headache had gone, though slight vertigo and a little nausea remained. The quantity of urine passed was small whilst the headache and sickness continued—but on the two days following was considerably above the average of the amount passed previous to taking the caffein. The diuretic effects of caffein commonly last over two or three days after its administration ceases, and in the absence of any other cause there can be little doubt that the increase of water observed from the 26th to the 29th was the direct result of the drug, the vomiting and general nervous disturbance on the 27th preventing very copious urinary secretion on that day.

Though the diuresis continued so short a time a manifest improvement in the condition of the patient followed. The

pulse decidedly improved in force and regularity. The pulse tracing of the 7th of January when compared with that taken on the 28th, two days after the larger dose of caffein was administered, seems to show that the caffein had steadied the heart's action. Immediately before the caffein was given the pulse was so weak that I failed after a prolonged attempt in obtaining a satisfactory tracing.

By the 1st of February the ascites and œdema had almost gone, and the liver had decreased considerably in size, though it still remained large. From the 1st to the 10th of this month the man took ♏ x. of liq. ferri perchloride three times a day, and after the 4th neither œdema nor ascites could be detected. When he left the hospital he was in a condition of comparative comfort.

CASE V.—P. P., aged 34, was admitted into the infirmary on the 18th of October, and died on the 18th of December, 1879. About six months before admission he had been under my care for chronic Bright's disease of many months' standing. At this time, however, a faint diastolic murmur was heard though the other indications of aortic incompetence were very slight.

On returning to the hospital in October the evidence of incompetence was much more decided; the heart was much enlarged, and the man suffered from bronchitis, œdema of the lower extremities, and ascites. The urine, on admission, contained much albumen with epithelial and granular casts.

For the first fortnight the man took tincture of digitalis and citrate of potash. Under this treatment the quantity of urine passed averaged fifty-two ounces per day. In the succeeding week, when citrate of caffein was taken every three hours in three-grain doses, the average quantity of urine passed was only fifty-one ounces.

Subsequently the quantity of water passed decreased considerably, and many diuretics were tried in vain. The œdema and ascites increased, and the man died from lung œdema.

In this case the citrate of caffein did not once produce that sudden increase in the urinary secretion which has been noted in the four previous cases, nor did it ever cause severe headache or sickness. At the post-mortem both parenchymatous and inter-tubular changes were found in the kidney.

Case VI.—A. M., aged 29, was admitted into the infirmary on the 4th of December, 1879, with evidence of an incompetent and contracted mitral valve, and a weak and dilated heart, the right cavity of which was evidently very greatly distended. He suffered from bronchitis and orthopnœa. His face was livid, his legs anasarcous, his pulse was feeble in the extreme and almost uncountable. The amount of urine passed averaged twenty-five ounces per day: it contained no albumen.

Citrate of caffein in three-grain doses failed to produce diuresis, nor was digitalis of more service. The man died fourteen days after admission. As he was subject to headache and sickness before he took the caffein no inference can be drawn from the existence of these symptoms afterwards. The headache was not lessened by the caffein.

Case VII.—T. S., aged 31, was admitted into the Manchester Infirmary on the 10th of November, 1879, with mitral stenosis and incompetence, following an attack of rheumatism three years previously. More or less œdema of the legs and ascites had been present for eight months.

On admission the œdema of the extremities was slight, the ascites considerable, the heart dilated and the pulse feeble and irregular. The quantity of urine was very small, varying from five to fifteen ounces per day, devoid of albumen. Before admission he had been tapped twice. First digitalis and then citrate of caffein were given, but both failed to increase the urinary secretion or give relief. The caffein twice tried in three-grain doses produced both times severe vomiting, but did not in the least increase the urinary secretion. On both occasions the vomiting ceased when the drug was stopped, though from time to time he had attacks of indigestion apart from all medication. The man left the hospital unrelieved three weeks after admission.

I propose to discuss further on the *rationale* of the action of caffein as a diuretic and the causes of its success and failure in different cases; I only wish at present to draw attention to the fact that several of the cases above recorded tend to confirm the conclusions of Gubler, Shapter, and other physicians, that we have in citrate of caffein a diuretic of no little value in cardiac dropsy, one too which succeeds at times where digitalis and

other diuretics fail. Case II. shows that chronic kidney congestion does not prevent its action, but in the only instance where definite renal and cardiac disease were concurrent the caffein failed to act, and I shall subsequently show that it usually, if not always, fails as a diuretic where the kidney tissue is much at fault.

(To be continued.)

THE USES OF BORACIC ACID.

BY F. P. ATKINSON, M.D.

CONSIDERING the well-known antiseptic properties of boracic acid, it is exceedingly curious how little it has been administered as an internal remedy. Its effect in diphtheria both locally and internally is very marked, and the following statement by Drs. Cossar Ewart and Malcolm Simpson proves in a pretty conclusive manner the action it has upon the disease germs: "Pieces of membrane which had been brushed with a saturated solution of boracic acid, when placed on the warm stage of the microscope showed the characteristic bacilli; but these were absolutely innocuous, and instead of lengthening into spore-bearing filaments, micrococci bacterium termo or torula appeared in their stead. By the use of the acid the disease was shortened and the other members of the family were protected from infection." In the treatment of *puerperal fever*, combined with sulphuric ether (which is also an antiseptic), and when it has been found necessary a little tincture of opium, it has given more decidedly beneficial results than anything with which I am acquainted. I feel certain that it ought to hold an important place in the treatment of carbuncular disease—erysipelas, cholera, scarlatina, enteric, typhus, and intermittent fever—and in fact all those cases which are known to have a septic origin. From what I know of its power in combating the action of disease germs, I cannot help thinking it would materially lessen not only the intensity, but also the duration of the various eruptive fevers. I incline to this belief very strongly; time will quickly show whether it is correct or not. It is but sparingly soluble in cold water; an ounce will only take up about 18 grains, but a drachm of boiling water will dissolve about 5 grains. The dose is from 5 to 15 grains. It has one particular recommendation, and that is its tastelessness.

ON CATARRHAL PNEUMONIA AND TUBERCLE IN THE HUMAN LUNG.

BY D. J. HAMILTON, M.B., F.R.C.S. ED., L.R.C.P. ED.,

Demonstrator of Pathology, University of Edinburgh, Pathologist to the Edinburgh Royal Infirmary.

(*Continued from page* 187.)

CATARRHAL PNEUMONIA—SECOND STAGE.

THE disease *always* passes through the first stage either acutely or sub-acutely. In children, after measles or whooping-cough, and sometimes idiopathically in adults, the first stage is extremely acute, but in other instances, more particularly in the adult, it is ushered in as a sub-acute disease, and bears this character throughout. The groups of air-vesicles are gradually filled with the catarrhal alveolar products, and the symptoms are correspondingly asthenic in character. The first stage ends with the accumulation and distension of the air-vesicles with catarrhal cells, and is followed, in the course of a few weeks, or in a shorter time, by the second stage, or that of caseation.

It has been remarked (p. 177) that the patient generally traces the commencement of his ailment to what he describes as "catching a cold," corresponding, as we have seen, to the first stage of the disease. If further interrogated as to the course which the ailment followed, some such expression as "the cold sank down upon my chest," will be employed to indicate that the first stage was not recovered from. This feeling of "sinking down upon the chest" corresponds to what I designate the second stage of the disease, or that in which the accumulated alveolar contents become caseous. Adults usually

live on to the third or last stage of the disease, namely, that of phthisis, but they occasionally die before that is reached. Children, however, frequently die before any excavation or phthisis ensues. The naked-eye appearance of the lung in the second stage is the following :—

There is generally old fibrous adhesion of the two pleural surfaces, sufficient to obliterate the pleural cavity either partially or completely. The apex is the part at which this adhesion is usually most evident. Fibrinous effusion may be present on the non-adherent parts of the pleural surface. Irregularly rounded projections of the lung-tissue are noticed on the surface, and the organ when removed does not collapse. It is much increased in weight, and, on account of its remaining distended after removal, appears to be, and actually is, increased in bulk. When grasped in the hand, rounded nodules, corresponding to the above-mentioned projections, of hard consistence, and sharply-defined from the surrounding vesicular tissue, can be felt within it. When the organ is laid open the most evident abnormal feature is the presence of these nodules. In the first stage of the disease the pneumonic portions were distinguished as *patches* of slightly infiltrated lung-tissue having a greyish-yellow colour, and from which catarrhal fluid could be squeezed out. Now, however, the patches have lost their indefinitely indurated character, and form hard *nodules* with a sharply-defined border. These nodules vary in size from a millet-seed up to that of a walnut; they are rounded in shape, and their border is somewhat irregular. They are dry on section, and have a cream-yellow colour. They appear to be little masses of tissue which have undergone caseous transformation. The smaller tend to run together to form larger nodules, and, occasionally, a great portion of a lobe may become continuously infiltrated by the further confluence of these.

The nodules are usually most numerous at the apex of the organ, but not by any means always so. They are relatively more abundant near the pleura than at the centre of the lung, and they spread out in a racemose manner, like a bunch of grapes. In the centre of such a group an occluded bronchus is sometimes seen, giving to it a still further resemblance to a

bunch of grapes with the stalk in the centre. The intervening lung-tissue is vesicular and moderately congested. It is occasionally, but not usually, slightly œdematous; the prevailing character of the whole lung is that of great dryness. The nodules look like little tumours lying in a comparatively healthy lung.

The bronchi are generally in a state of catarrh. Their mucous membrane is red, and from their openings mucopurulent discharge can be squeezed out. The bronchial glands

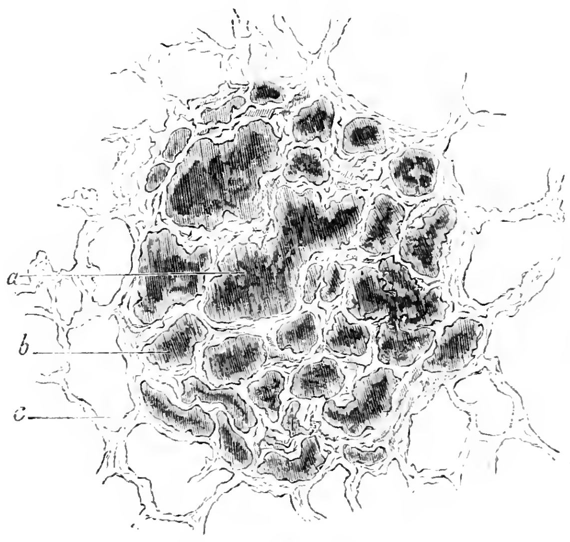


FIG. 11.—Catarrhal pneumonia, second stage. Shows a caseous nodule magnified 50 diams. *a*, infundibulum filled with caseous material; *b*, air-vesicle distended with the same; *c*, neighbouring air-vesicle comparatively healthy.

are almost invariably enlarged, and either show some grey markings in their interior, or they are yellow and caseous.

These yellow and dry nodules were called "tubercles" by Laennec, and were looked upon by him as specific growths, not merely as inflammatory products. He says (*Diseases of the Chest*, p. 253), "The matter of tubercles may be developed in the lungs or other organs under two principal forms, that of insulated bodies and infiltration." Nothing could have been more unfortunate than this designation of these bodies, for it is

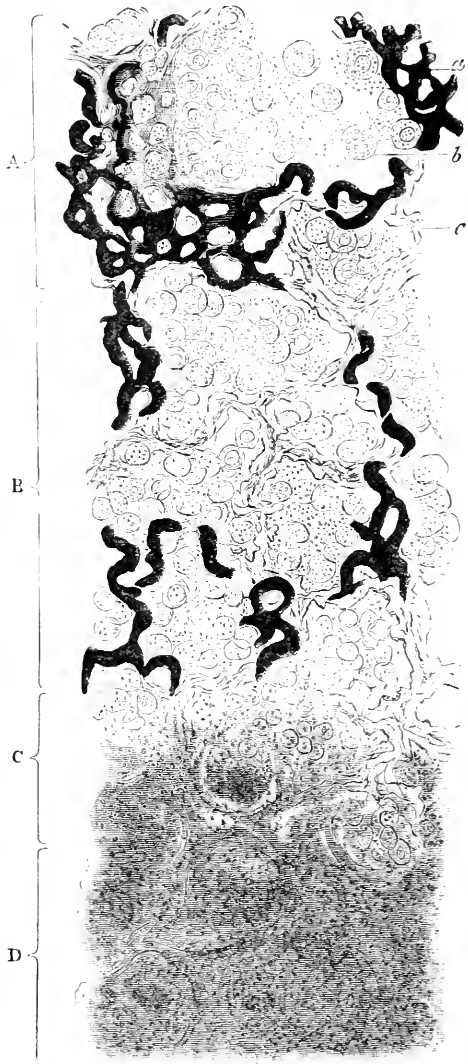


FIG. 12.—Catarrhal pneumonia, second stage, showing a nodule magnified 350 diams. A, B, C, and D, represent different areas in the nodule from the periphery towards the centre. *a*, injected capillaries of alveolar wall; *b*, catarrhal cells in alveolar cavities. *c*, an alveolar wall.

through this means that so much confusion has taken place in understanding the true nature of catarrhal pneumonia. They

are even yet constantly described as "tubercle" nodules, "tubercular," or "tuberculoid" masses!

Let us examine these nodules a little more closely. A representation is given of one of them magnified fifty diameters, in Fig. 11, and a portion of a similar nodule, more highly magnified, in Fig. 12. When the low-power drawing is examined, it can be noticed that the nodule is made up of *a group of air-vesicles* distended with solid constituents. The outlines of the alveolar walls are still apparent, but the part is rendered totally non-vesicular by the presence within the air-sacs of solid material. This appears to be amorphous, granular, and peculiarly dusky or cloudy, and, when examined with transmitted light, has a brownish or dull grey colour. The reason why the infiltrated patch of lung-tissue assumes the characters of a nodule is, as seen in the drawing, that the effusion is confined to one isolated group of air-sacs, almost to the complete exclusion of those in the neighbourhood. On careful examination it can be perceived that this group of distended air-sacs is occasionally attached to a terminal bronchus or to an infundibulum. In the centre of the nodule represented in Fig. 11 a distended infundibulum (*a*) is observed, and, had this been traced a little further upwards, it would in all probability have been found to be continuous with a small bronchus similarly occluded. It will be noticed that the solid effusion closely adheres to the alveolar walls, and being, as we have seen from the naked-eye examination, a hard substance, it would be a very difficult matter to dislodge it either by efforts of coughing or by other means. The group of air-vesicles is firmly packed with it, so that the alveolar walls and their solid contents may, practically speaking, be said to be continuous, giving the impression of a solid tumour when touched. It was this which, in the absence of accurate microscopic observation, misled Laennec and his followers, and caused them to look upon such nodules as neoplasms growing in the lung-tissue, and it is on this account that, even at the present day, they are so often looked upon as being tubercular.

The surrounding air-vesicles are often in a state of acute catarrh. In Fig. 11 it will, however, be noticed that there is not any evidence of this, but that the adjacent pulmonary tissue

appears to be comparatively healthy. This is frequently the case, the implication or not of the surrounding lung-substance depending on whether an intercurrent attack of acute catarrh has been present at the time of death. If this should have been so, then the surrounding air-vesicles show the same appearances as those figured in the different drawings representing the acute stage.

A more highly magnified view (350 diams.), not of the same but of a similar nodule, is given in Fig. 12. A segment of it is supposed to be cut out, the periphery towards A and the centre towards D. The drawing was taken from an injected preparation, and different areas, A, B, C, and D, are marked off, in order to indicate the progressive changes from the periphery towards the centre of the nodule. Suppose then that the area marked off at A, which of course would correspond with the periphery of the nodule, be first examined. It will be observed that in it the outlines of the air-vesicles (C) are still quite distinct. The capillary blood-vessels of the alveolar walls (*a*) have evidently been pervious, because the injection has run with ease through them. The cavities of the air-vesicles contain, but are not in this area distended with, catarrhal cells, similar to those previously described under acute catarrhal pneumonia. Some of these possess large nuclei, while others have been deprived of them, and are more or less fatty. Around the catarrhal cells there is a deposit of precipitated mucus, in which they are suspended.

As we proceed to the area comprised within the brackets at B, and which corresponds to a part nearer the centre of the nodule, these catarrhal cells become much more numerous, and now, instead of lying loosely in the alveolar cavities, they are closely packed together and distend them. Each group of catarrhal cells forms a little mass, the individual cells of which are closely united by mucus as before. Many of the catarrhal cells are, however, undergoing disintegration, so that fatty and albuminoid particles are set free, and these, mixing with the mucus already present, give it a highly granular appearance. It will be observed—and this is a most significant point, which can be verified either in an artificial injection, or in a natural injection with blood-corpuscles—that the pervious blood-vessels within

this area are very much less numerous than in the area more removed (Fig. 12). All the nodules, in this stage of the disease, show this defect in the number of blood-vessels, as the centre of the nodule is approached.

When we pass to the area comprised within brackets C an additional change is observed. The catarrhal contents of the alveolar cavities have now lost their distinct form, and have become shrivelled, dusky, and granular, while the blood-vessels, which were still perceptible in area B although much diminished in number, have now entirely vanished. It is also evident that the alveolar walls are assuming the same dusky and granular appearance visible in their catarrhal contents. This dusky granularity is the microscopic evidence of commencing caseation, and shows that the part is dead or dying.

When the area D is reached, which corresponds with the centre of the nodule, the whole tissue is seen to have become completely caseous. The catarrhal cells are now no longer visible, but in their place there is an accumulation of dusky and cloudy caseous *débris.* The outlines of the alveolar walls have also undergone caseation, and have insensibly been fused, along with the alveolar contents, into an amorphous dusky and indiscriminately granular mass, in which the original lung-tissue can with difficulty be recognised.

Such then is the structure, from the periphery inwards, of one of these caseous nodules seen in the second stage of the disease. It is made up of a group of air-vesicles containing a few catarrhal cells at the periphery, filled to distension with them in the middle, and becoming caseous in the centre. The pervious blood-vessels progressively diminish from the periphery inwards, until, towards the centre of the nodule, they are absent. If we compare the appearances represented in this figure with those of Fig. 9, it will be perceived that the characteristic difference is that the catarrhal cells, in the second stage, are more closely packed in the air-vesicles, and that the centre of the infiltrated portion of lung-tissue has become the seat of caseous necrosis. Further, that while the vessels of the centre of the pneumonic patch can be injected in the first stage, they are impervious in the second. These changes are sufficient to cause the soft "frog's-spawn-like" pneumonic patch of the

first stage to assume the consistence of a hard yellow nodule in the second. The part, as it becomes caseous, loses some of its fluid, and at the same time acquires greater bulk, from the accumulation of the catarrhal cells; and hence the previously soft consistence which it had changes to that of a cheese-like hardness.

There is of course nothing special in the caseous degeneration of these pneumonic products, and of the lung-tissue in which they are contained. It is identical with what is so frequently seen in other parts of the body under similar circumstances. The process of caseation in catarrhal pneumonia is very much like that of the conversion of milk into cheese. The solids of the pneumonic effusion become relatively abundant; the fluid either drains off, or the solids increase in greater proportion than the fluid. These solids are composed of oily and albuminoid constituents, which first undergo partial separation, and then become fused together into a structureless cheese-like mass.

The condition under which caseation is liable to occur in any part of the body is *where the blood-supply is gradually cut off from the part.* If a terminal artery going to a part is *gradually* occluded, say by the process of thickening of the tunica intima, known as "arteriitis obliterans," it caseates, provided of course that anastomotic branches do not restore the circulation. Direct pressure, where the blood-supply is maintained, *does not* induce caseation, but gives rise to atrophy of the tissue elements, that is to say, to a mere separation and absorption of their particles.

Why is it, therefore, that caseation should be so liable to occur in catarrhal pneumonia? The reason becomes apparent on looking at an injected preparation (Fig. 12). We have seen that in the first stage the catarrhal products accumulate in the air-vesicles, and, if not removed, distend these, so as to press deleteriously on the alveolar walls. The area B (Fig. 12) shows this to be the case. The accumulation of the catarrhal products occurs gradually, and the pressure exerted upon the alveolar walls by them is consequently slowly applied. The circulation within the alveolar capillaries is thus progressively arrested, so that they can only partially be injected (Fig. 12, B). As a result of this gradual deprivation of nutritive fluid the parts undergo a slow form of necrosis known as caseation,

affecting those tissues first which have least vitality, namely, the catarrhal products, but finally also involving the alveolar walls. The fluid drains off from the part through the absorbents and other channels, and, as little fresh fluid is being carried into it as blood, it naturally becomes drier than formerly, and hence is not so liable to undergo rapid decomposition. If the blood-supply were *suddenly* cut off from a large area, and before this natural system of drainage had taken place, the chemical changes set up would be different, so that instead of the part caseating, it would undergo the moist form of disintegration known as gangrene. In the making of cheese the curdled milk is compressed, so as to drive out the milk serum. The solids of the milk which remain will then keep free from further chemical change for a very considerable period of time. The milk-curd, however, if allowed to retain its serum, would undergo almost immediate chemical decomposition. The pressing out of the fluid of the milk has the power of arresting chemical change, and of determining a different kind of decomposition when that does occur. This is popularly known as the "ripening of the cheese," an event which may be avoided for years. These two processes are quite analogous to caseation and gangrene in the human subject. In the one, the serum is strained off from the oily and albuminoid constituents of the tissues, and a drying of these consequently takes place. Under such circumstances the caseous product, as it is called, may lie in a part of the body unaltered for many months, or even years. In a gangrenous tissue, however, much more active chemical decomposition is set up, on account of the moisture which it contains, and the process is accompanied by putrefactive fermentation.

Patches of lung-tissue affected with catarrhal pneumonia will be specially liable to become transformed into caseous matter from the fact that the catarrhal solids *gradually* accumulate in the air-vesicles. Were the air-vesicles suddenly distended with them there would be a greater likelihood of their becoming destroyed by a moist fatty metamorphosis. There is another reason, however, usually overlooked, why caseation should be of such frequent occurrence in the lung when affected with catarrhal pneumonia. In a person suffering from the acute or sub-acute

attack, the irritability of the bronchial tubes is greatly increased, inducing, as it does, frequent attacks of coughing. In the act of coughing a full inspiration is taken, the glottis is closed, and the air within the chest is compressed by the muscles of expiration. In this way enormous pressure may be brought to bear upon any foreign contents of the alveolar cavities. If these should be partly composed of fluid then this fluid will be driven through the alveolar walls, and will be removed by the neighbouring absorbents. In the first stage of the disease a considerable amount of fluid is contained within the catarrhal pneumonic secretion, which undoubtedly will be pressed out of the air-vesicles when the patient coughs, while the solids will be left within the air-vesicles in a more or less dry condition. This must therefore be a cause of the utmost importance in predisposing to caseation, and may perhaps account for the greater liability of this organ to undergo caseous metamorphosis than others which also suffer from catarrhal affections. In respect of this positive pressure exerted by the expiratory muscles in coughing, the lung may very appropriately be compared to the cheese-press used for the purpose of squeezing out the serum from the solid parts of the milk.

Such considerations make it evident that the more asthenic the course of the first stage is, the more liability will there be to the gradual accumulation of catarrhal products, and to their drying and caseating. If we could artificially induce an œdema of the lung where there is a suspicion of incipient caseation, little danger of this taking place would be incurred. The statement which I have before made, to the effect that caseous catarrhal pneumonia does not supervene in patients previously the subjects of mitral disease, bears this out, and the explanation undoubtedly is that the epithelial cells of the alveoli—although constantly being shed from the alveolar walls in such cases—mix with so much œdematous fluid that they cannot undergo the drying process necessary to cause them to caseate. The dry crackle of a caseating catarrhal pneumonia, as compared with the moist râles of an œdematous lung, sufficiently indicates the difference in the two kinds of alveolar contents. In the one case an inspissated viscid fluid is the cause of the sound, in the other it is due to a fluid containing much more water.

I have before indicated, and it must be a fact familiar to all, that caseation in catarrhal pneumonia generally commences at the apex. It is an equally important fact, however, and one not so generally recognised, that the pneumonic patches in the acute or sub-acute stage are not more abundant at the apex than at other parts, but are equally distributed throughout the lung, if anything, more numerously at the middle and base. It is those, however, that are situated towards the apex which are most liable to caseate, and to pass into a chronic state. Those at the base generally undergo a moist fatty resolution, and are removed in the first stage. How is this to be explained? The reasons are probably two in number. The first and most important is, that the apex is the driest part of the lung, while the base, from gravitation of fluids, is always, in an acute catarrhal pneumonic attack, more or less moist. As the catarrhal mucus is secreted at the apex its fluid will tend to drain down to the lowest part of the lung, leaving the solids entangled in the air-vesicles. The catarrhal products at the base will therefore be more likely to undergo a moist fatty degeneration, while those at the apex will tend to undergo greater inspissation, and will thus be more liable to caseate. The other reason is, that the apex of the organ expands least. There is less motion at this part, and hence the catarrhal products have a greater tendency to be arrested in it.

The caseous nodules are more numerous at the periphery than at the centre of the lung, and this is accounted for by the inspiratory efforts drawing the catarrhal fluid outwards. The "bunch of grapes" arrangement, which the nodules frequently have, is due to the distribution of a small terminal bronchus connected with several different groups of air-vesicles. Each little area of lung-tissue, when distended with caseous products, figuratively represents a grape, while the bronchus with which its air-sacs communicate may be looked upon as the stalk.

When the pneumônic nodule has become completely caseous it lies, as before mentioned, like a foreign body in the organ, to all intents and purposes a dead mass of animal tissue. Several changes may now ensue in the lung-tissue around it. The commonest is, that by repeated small intercurrent attacks of catarrhal pneumonia, in the vesicular lung-tissue between the

caseous nodules, the neighbouring air-vesicles also become infiltrated with catarrhal products, so that the one nodule fuses with that next to it, and a larger mass thus results. In the course of time an entire lobe may become continuously involved in this way with caseous catarrhal deposit. It was to such that the name "infiltrated" or "crude" tubercle was given by Laennec, on the understanding that these yellow caseous masses were tubercular in their nature.

Another change noticed in the neighbourhood of these caseous pneumonic masses is, that the surrounding alveolar walls become thickened by formation of fibrous tissue, so that a spurious capsule is in this way formed. Such masses may be said to be encysted, and when this occurs they appear to be able to resist further chemical decomposition for a long time.

A third complication noticed around them is the effusion into the surrounding air-vesicles of a *croupous* exudation. This is occasionally to be expected, considering the principles on which such croupous exudations are formed. A great number of the blood-vessels in the lung are obliterated, from their being implicated in the caseous masses, and, of course, extra strain is put upon the remaining vessels which are pervious. In such cases a slight increase of the pumping action of the right ventricle will be almost certain to force into the pervious air-vesicles a fluid containing a high percentage of albuminoids, that is to say, a fluid rich in fibrin-forming materials. The only reason why croupous exudations in such lungs are not more abundant than they are is, that the obliteration of the vessels in the caseous nodules takes place gradually, so that the circulatory apparatus has time to accommodate itself to the new conditions, while the circulatory powers of persons affected with this disease are also unusually feeble. The extent of the croupous exudation in such cases varies, being, sometimes, general throughout a lobe; at other times, localized to a particular group of air-vesicles. When of a general character it is of course a serious complication.

Pleurisy, more or less general, is almost invariably present in this stage. I have previously remarked that, in the first stage, pleurisy is not one of the usual features of the disease, in this respect forming a marked contrast with croupous pneumonia, in

which it is seldom absent. In the second and third stages of catarrhal pneumonia, however, the pleuræ are always adherent. The bond of union is either fibrous or fibrinous—not unfrequently both kinds of union are present, the fibrous being the remains of a former pleuritic attack, the fibrinous being the evidence of one more recent. The appearance presented on microscopic section of the pleura and neighbouring portion of lung in such a case is very instructive. The caseous and obliterated air-vesicles are seen scattered throughout the lung, with intervening portions of lung-tissue either comparatively healthy or containing some exudation. For about one-eighth of an inch of the lung-tissue adjacent to the pleura the whole of the alveolar capillaries are distended with blood-corpuscles. Branches come off from these, which run into the deep layer of the pleura and anastomose with its vessels proper. Both sets of vessels are similarly distended with blood. They further communicate with the vessels of the superficial layer of the pleura by a free anastomosis. The latter, however, instead of ramifying, as they usually do, in a horizontal manner, within the fibrous tissue of the membrane, are thrown out in loops, exactly as on a granulating surface, while round them there are cells of a granulation character. In many places the vessels have forced their way through the pleural endothelium, and have carried with them the surrounding granulation cells. It is by the coming in contact of two such parts from adjacent sides of the pleural cavity that adhesions take place. On the surface of the membrane, and in the fibrous meshes of the pleura, much fibrinous exudation, with leucocytes in it, is visible, while the granulation vessels also carry with them numbers of larger cells, derived either from the pleural connective tissue or from the pleural endothelium. By the organisation of these the permanent fibrous union is accomplished. The whole appearances are indicative of undue pressure applied to the pleural and pulmonary capillaries. The pleural surface becomes, practically speaking, a granulating surface, the granulation loops projecting into the effused pleural fluid. When this fluid is absorbed, the two pleural surfaces come in contact, and permanent adhesion takes place. The cause of the undue vascular pressure which occasions the pleurisy is the

same as that which sometimes forces a croupous exudation into the lung, namely, that part of the capillary surface of the lung being destroyed by the caseous degeneration, too great a strain is brought to bear upon those vessels which are still pervious. This reacts upon the pleural vessels, causing increased exudation and the construction of a false or fibrinous membrane, followed by adhesion. As the lung becomes more and more implicated in the disease, that is to say, as the third stage is reached, the pleura is still further involved, until, as usually happens, the pleural cavity is totally obliterated. I cannot look upon the pleurisy, which is invariably associated with catarrhal pneumonia in its second and third stages, otherwise than as a manifestation of the effects of diminishing the circulatory capacity of the lung.

Hæmoptysis is met with in this stage, and the cause of it undoubtedly is a further increase of that blood-pressure which induces the occasional croupous exudation. It is due to large tracts of lung-tissue being practically useless for purposes of blood-circulation, so that, on any increased excitement of the heart, the tension of the blood in those vessels which are still open becomes sufficiently raised, not only to cause the transudation of fibrin-forming solids, but actually to give rise to rupture of their over-strained coats. Any unusual exertion, such as running or other muscular effort, by which the pulmonary circulation has increased demands on its capabilities, will be sufficient to determine this. Were all the circulating channels quite free, no ill-effects would be experienced, seeing that the venous outlets are always more than sufficient to carry off any amount of blood that may be pumped into the organ by the arterial inlets. But when, as has been described, the caseous tracts destroy a large part of the capillary channels, it is only natural that if an increased quantity of blood be driven into the organ, the strain thrown upon the still pervious vessels will be sufficient to produce either exudation of fibrin-forming solids, or, if carried further, actual rupture and hæmoptysis. The same principle is at work here as in other similar circumstances. Wherever the venous outlets of the circulation in a part are insufficiently large to accommodate any sudden increase in the quantity of blood poured into them, one of three things will

follow, according to the amount of strain they suffer—either the part will become œdematous, or a croupous exudation will be poured out, or actual rupture of the engorged vessels will follow.

Where the pneumonic masses are not very numerous they may become inert, by a process of calcification. The caseous matter seems to be gradually absorbed, and an impregnation of the part with calcareous salts follows. It is in nodules which are surrounded by a fibrous capsule that this is most usually seen.

If the patient survive long enough, however, the commonest sequence noticed in these caseous catarrhal nodules is softening, and it is this which constitutes the third stage, or that of phthisis. Following the order of description of the different stages that I have pursued, the third stage ought to be next taken into consideration. As, however, it would be impossible for me to make this intelligible without first explaining what tubercle of the lung is, it will be necessary to postpone the investigation of the phthisical stage of catarrhal pneumonia till afterwards. I shall therefore, as a preliminary measure, crave the reader's attention for a short time to the subject of "Tubercle in the Human Lung."

ON THE MANAGEMENT OF INFANTILE ECZEMA.[1]

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"To be a successful practitioner in the treatment of eczema a medical man must be an accomplished physician; to manage the local treatment with success he must be an able surgeon."—*Wilson*, p. 163.

By infantile eczema is here understood cases of this disease occurring in children of five years old or under, although writers have not generally been very definite in fixing upon the time of life at which it ceases to be properly so called. There are reasons, however, for classing all cases of eczema occurring during the first five years of age together, and for considering them under one designation, whereas no objections can be reasonably raised to such a procedure.

The periods of life are conveniently divided into decades and half decades; and if we look at the statistics of a large number of cases of eczema, we shall find that the first decade of life presents a very much larger proportion of cases than any other: by far the larger share of cases in this decade will be found in children of five years of age or under. Thus, of 2,033 cases of eczema, 524 came within our definition of infantile eczema, or 25·7 per cent.; the percentage in private practice being 16, or 82 cases in 524 of eczema, and the dispensary average being 30 per cent. This proportion would be increased very largely did not a certain number of patients with infantile eczema find,

[1] Read before the Medical Society of the State of New York, February 3, 1880.

their way to the children's department of the dispensary, while, of course, multitudes of cases are never treated at all, owing to the impression so prevalent both among the laity and the profession that it is either dangerous or useless to treat this disorder. The layman fears lest some harm may come from the disease being "driven in;" which fear the physician sometimes fosters from ignorance, or from carelessness and unwillingness to cope with the case. The little sufferer from eczema, therefore, is left to bear his trials unaided, with the hope that with each change in its physiological condition the disease will pass away. Thus, the eruption being called "milk-crust" during nursing, the assurance is given that it will cease when it cuts its teeth. When this stage is arrived at, and the eruption is aggravated with each accession of a tooth, the eruption takes the name of "tooth-rash," which will cease when certain teeth are through. These come, and yet the disease persists, little being done to check or modify it; and so on. I have seen multitudes of cases which had lasted two, three, four, or more years; and in one instance I have seen a characteristic moist eczema, a veritable milk-crust, which had remained on the head from earliest infancy to twelve years of age; and in another instance a gentleman of thirty-one years of age had had the same on the legs since the first year of life.

Now we by no means deny that the eczema of infancy is very intimately associated with the milk and with the irruption of the teeth, but we do not start with the proposition that it is not necessarily a result of either the partaking of milk or of the formation and breaking through of the teeth, but that it always and invariably signifies an error of some kind which medical thought should avert; and that it is, like any other aberration from health, a condition of affairs which medical skill should remove.

Infantile eczema presents certain features different from the phases of the disease which are seen in adult life, and these features, which are dependent upon the structure and the quality of the skin of children, are such as almost to render it another disease, and to call for quite different management, at least in most cases, from the same eruption in adults.

The expression, the *management* of infantile eczema, was

chosen as a title, instead of the *treatment* of infantile eczema, because it was wished to impress the fact that the disease is of such protean shape, and the etiological facts so varied, that it is difficult to speak of the measures to be employed as a treatment, inasmuch as they are better considered as a management of the patient in all the relations of life, than as routine treatment to be given simply because the eruptive eczema is present.

We will therefore begin with the etiology of the disease, as we understand it; and, in considering this, will rather state practical facts from experience than cite authorities.

Infantile eczema is by no means an hereditary affection; that is, in but a small proportion of the cases are the parents, one or both, the subjects of the same; and, conversely, parents may have eczema which their infants escape. It is true, however, that many parents with a strong eczema tendency have children thus affected, although they themselves need not have the eruption at any particular time when the child happens to have it. It need hardly be stated that eczema is never acquired by contagion, although the laity will often thus believe.

The fact cannot be denied that a majority of infants with eczema appear to be in perfect health; indeed may be *apparently* healthier than the others in the family who have not the eruption; they are not infrequently of a ruddy colour, have good appetites, with regular action of the bowels; and parents are with difficulty convinced that there is some error beyond the simple skin lesion; and yet I feel confident in affirming that exceedingly careful medical investigation will always discover something to be corrected besides the disorder of the skin.

In nursing infants with eczema, I very commonly find that the mother is in the habit of consuming large quantities of tea, or perhaps beer or ale, or takes wine pretty freely. Or perhaps she is taking only chocolate or milk, and these disagree with her, causing dyspepsia; or she is constipated, or her urine shows disorders indicative of derangement of digestion and assimilation. Now, if these elements exist, if the mother's secretions, as from the bowels, kidneys, skin, liver, &c., are not healthy, certainly the secretion of milk is not healthy, and thus it can provoke disorder in the child. In the case of nursing infants

with eczema, therefore, my attention is always turned first to the mother; and I believe I can say that in an enormously large percentage of cases, if not always, I find errors of assimilation and disassimilation in the mother which must first be corrected before we can hope for or expect great and permanent benefit to the child. It must never be forgotten that a patient may have extensive oxaluria as almost the sole indication of mal-assimilation other than a general tired feeling, &c. I never allow mothers nursing eczematous children to take any fermented liquors, and generally cut off the quantity of tea drunk, especially if it is used in excess. Milk I conceive to be the best food upon which the mother may form milk; and seldom do I fail to have it used freely. If it is not well borne at first, the habit of taking it can be acquired. Frequently it is necessary to add a little alkali; and I commonly use the liquor potassæ, ten to fifteen drops to the tumblerful of milk.

In not a few instances the milk furnished by the mother is absolutely too weak to sustain the child properly, and we must either provide other nourishment or improve the mother's health, or both. I have very frequent occasion to prescribe for the mother, giving tonics, alkalies, &c.; and it must never be forgotten that the mother may require oily matter, as cod-liver oil, as well as the child.

When the nutriment from the mother is weak, we may supplement it with cod-liver oil, which I continually give even to very small children with eczema; or, where it can be had, I believe that cream should certainly be given to the infant with eczema whose nurse-mother is in poor health and furnishing milk insufficiently rich. Or, again, oil may be administered by inunction, cod-liver, linseed, or sweet almond oil being used. For eczema is decidedly a disease of mal-nutrition, in every subject, from the youngest to the oldest.

I see many infants with eczema, who are being fed very erroneously, either in conjunction with nursing or in lieu thereof, and a change in diet often assists the management of the case wonderfully. Milk I believe to be the proper nourishment for children under one year of age, and yet very few of those which I see are thus fed. Most of them are taking too large quantities of starchy food, corn starch, farina, &c.; and in many instances

far too much sugar is given with the food. These elements all require attention in the management of infantile eczema, if we really desire to cure the patient; that is, to effect a permanent removal of the disease.

I need hardly speak of the grosser errors of diet sometimes observed in these patients, other than to mention that I constantly find among the poorer classes children of the most tender years, or even months, who are allowed to partake of anything used by adults which they crave, and that it is not at all uncommon to find children with eczema even less than a year old, of whom the parents say with perfect *naïveté*, that they are "very fond of tea." It would seem as though such could not prevail among the better classes, but we have only to remember that the nurses, to whom so much is often committed, all come from the lower, ignorant classes; and unless they are watched and directed otherwise, they will practise just as they have been brought up at home. Moreover, if time permitted, I could give instances where very intelligent persons were feeding patients with infantile eczema in a most outrageous and inexcusable manner.

Constipation is a very frequent accompaniment of infantile eczema, though the reverse state, diarrhœa, is occasionally met with: either and both are evidences of mal-assimilation. For the constipation of children I use lactopeptine in doses sufficient to produce the desired effect. It is to be given directly after eating, and may be repeated once or more after each meal, if necessary. It is very conveniently administered in suspension, as in orange-flower water, though children often rather like to have it dry on the tongue. In the beginning of a case, nothing that I know of suits so well to unload the bowels and make an impression on the eczema as Wilson's treatment of calomel in doses suited to the age and condition of the child. Under a year I generally give one grain, well rubbed up with sugar, or with a little bicarbonate of soda, the dose being increased by about half a grain for each additional year of life. This powder may be repeated, if necessary, every other day, and I prefer to have it given in the morning, rather than at night, that the effects may be better watched, and that any uneasiness occasioned thereby may not disturb the night's rest. Often the powders need be given but once or twice a week, or even as occasion demands.

Any irregularity of the bowels, and especially any tendency to pulmonary congestion, should at once be treated by one of the powders.

Where the tendency to constipation is not overcome by these means the food must be changed; and even in very small infants I have oatmeal added to the food, in the way of a pulp, made by rubbing thoroughly-boiled meal through a fine sieve. Other modifications of diet may of course be necessary, but cannot be entered into here.

Sometimes in the desire to avoid starchy food animal food will be given in much too large proportion, and I have seen very young children stuffed with beef-tea, beef-juice, or extract of beef to an alarming extent; in one instance I believe the child died from this, together with brandy, which was freely given. In the more acute forms the diet should be light and non-stimulating, and the organs of digestion assisted, as will be mentioned later: for in every case there is more or less inactivity of the processes of assimilation and disintegration.

Coming to the medical treatment of infantile eczema, we find that remedies certainly have a very great influence in the disease. Calomel has already been mentioned, and if rightly used it is capable of very much good. Young children also bear alkalies very well, and will improve in general health as well under them. In nursing infants I generally give the mother acetate of potash, fifteen grains or so, three times daily after eating, with nux vomica and a bitter infusion. I do not know if it passes through the milk in any way, but it certainly benefits the child very much. Lime-water is of very great service, though I do not use it nearly as much as many. I am very fond of giving the child Vichy water with the milk, using it rather freely, and when the bowels are constipated I have a supply of Kissingen water, and one of Vichy, and have them used conjointly in quantities sufficient to relax the bowels a little. Children also do very well with a few drops of liquor potassæ added to the milk, say from two to five drops to the tumblerful, according to the age.

Where there is a good deal of restlessness at night, and the skin is rather dry and harsh, I give the acetate of potash three or four times daily in doses of from one to five grains in a tea-

spoonful of the liquor ammoniæ acetatis; if there is much arterial excitement this is improved by the addition of a drop of the tincture of aconite.

Children bear arsenic remarkably well. Some time ago I reported a number of cases of infantile eczema where the disease yielded in a very short time to Fowler's solution given alone, and since then I have had further proof of this. The remedy was given in cinnamon water, and of such a strength that each five or ten drops represented one of the arsenical solution. They were then given this in such a dose that a child a year old began with a drop three times daily of Fowler, and the dose was gradually increased by one-fifth of a drop, until two, three, or even more drops of the arsenic were taken thrice daily, or until there was some diarrhœa; the dose was then lessened. Under this plan the eruption quickly paled, and soon ceased, with little or no local treatment and with few if any dietetic or hygienic directions. But I have never felt it wise to recommend this plan, or to praçtise it very largely, for fear of possible evil results from the free use of so powerful a remedy. It is well to know that arsenic can and will exercise such a power; certainly in some cases, for I hardly think this could be relied on as its uniform effect, the cases were more or less selected.

In combination with other measures, however, arsenic should seldom if ever be neglected in the treatment of eczema; after the first year of life I make very considerable use of it in combination with the wine of iron, much as in the ferro-arsenical mixture of Wilson, which he lauds so highly.

The French arsenical mineral water, the Eau de Bourboule, is often of considerable service in infantile eczema; the dose for adults is from half to one tumblerful, with the meals; children may take a small wineglassful, alone or mixed with the milk.

Besides alkalies, cod-liver oil, and arsenic, iron should never be forgotten in infantile eczema: wine of iron, the ammonio-citrate and tartrate of iron and dialyzed iron, are especially applicable. Rabuteau's tasteless syrup of iron is also valuable and very acceptable to children. I also make considerable use of the syrup of the hypo-phosphites of soda, lime and iron, and am more and more pleased with its effects. I do not use the

syrup of the iodide of iron so much as do some, for I have seen it very often ineffectually employed by others.

In dispensary practice very many children with eczema receive the standard rhubarb-and-soda mixture, which contains a grain each or so of rhubarb and soda in the teaspoonful of peppermint water, and they are commonly benefited thereby. I think this well-tried combination is too much neglected in private practice, for the substitution of more agreeable but often less serviceable remedies.

The extract or tincture of Viola Tricolor has been recently received as a remedy in infantile eczema, I have no great experience to offer on the subject, as I have generally found the measures here recommended to be quite sufficient. The older French writers speak very well of it.

It is a little difficult to give in a few words the exact indications for the various remedies I have mentioned, and perhaps intelligent judgment will best decide, if it is borne in mind that it is the patient rather than the disease which we are to treat internally; the indications are more those suggested by educated thought, directed to restoring the system to perfect health, than to special remedies called for by the disease in question.

There are, however, tolerably clear lines of distinction between classes of cases which call for an alkaline and depurative treatment and those where cod-liver oil and more powerful tonics are at once demanded. Thus, in the full, ruddy-faced child, with an eczematous surface tending to give a dry, red surface, very itchy, or perhaps exuding considerable serum when washed or scratched, a full tonic course of treatment would certainly aggravate the complaint, especially if the child came of a gouty stock. Light purgatives and alkalies would be followed by amelioration of the itching, a lessening of the cutaneous congestion, and subsidence of the disease. On the other hand, the pale, strumous-looking child, in whom the discharge tends to crust up into yellow masses, will be benefited by iron, arsenic, cod-liver oil, &c., at once.

But this latter child, if care be not taken, may soon have the organs of life choked by the sudden influx of material to which it is unaccustomed, and will require the "cooling treatment" of an occasional purgative, possibly also alkalies,

Calomel is the better purgative for the first class of cases; rhubarb, castor-oil &c., are better suited for occasional use in the second.

But of course no hard and fast lines can be laid down, and there will occur many cases which cannot be clearly put in either category. Not unfrequently we give tonics and builders-up of tissue with one hand, while with the other, calomel, grey-powder, alkalies, &c., are administered. It must also never be forgotten that the full-blooded arthritic case first described will at a later period require the tonic course; for eczema is a disease of debility, whether there is a temporary and false appearance of hyper-activity of the system or not.

There are those who regard eczema as a purely local disease of the skin-tissue itself, independent of any systemic relations, but it is hardly necessary to argue the untenability of this view, which has been abundantly shown elsewhere. Certain it is that eczema in children has many constitutional relations, and while in certain cases the eruption may be largely or entirely removed by local remedies, its complete extinction must be by dietetic, hygienic, and medicinal measures as well.

It must ever be borne in mind, however, that the skin certainly is subject to acute inflammation from purely local causes, as when croton-oil is applied, or poison ivy, &c., and that in infants harsh usage may abrade and inflame the skin. All this is quite different from true eczema, and reasonable care, judgment, and experience will readily distinguish the cases of each.

While the general measures advised for infantile eczema have not differed so very greatly from those which are required in other conditions, and while emphasis has been laid on the fact that it is the patient rather than the disease which is to be borne in mind for treatment, on the other hand, in the local management of the disease there is need of special experience and knowledge. It is in the local treatment of diseases of the skin, and especially of eczema, both in infants and in adult life, that wisdom is required to make just the right application; for a wrong one will pretty certainly not only do no good, but positively do harm.

The experience both of the special and general medical profession has undoubtedly given to the oxide of zinc ointment the

palm for universality of use, and that perhaps rightly. But he is poorly able to treat infantile eczema who knows only oxide of zinc ointment, and that as directed in the pharmacopœia. The officinal ointment is made with lard, which has a drachm of tincture of benzoin to the ounce, and eighty grains of oxide of zinc. Now I have repeatedly seen this irritate tender skins, where if otherwise prepared a zinc ointment was soothing. In the first place I never use lard in ointments, if it can possibly be avoided; my preference is for the cold cream, the unguentum aquæ rosæ, which is made from almond oil, spermaceti, and bees' wax. This may possibly become rancid, but has but slight tendency to do so; it as well as other excipients should be watched, as a rancid oily matter is exceedingly irritating to diseased skin. The unguentum petrolii or cosmoline, or the glycerite of starch, is preferable to the lard, but the rosæ ointment is really the best of all.

The strength of eighty grains to the ounce is very frequently too great, and I seldom employ more than sixty grains to the ounce, and far more often but thirty grains in infantile eczema.

But there are many other measures suited to different states of eczema in children which are far more serviceable than simple zinc ointment alone. The old fashioned tar ointment is a remedy which has fallen into unmerited neglect. As directed in the pharmacopœia, of equal parts of tar and suet, it is much too strong for application to a child's skin, or to any inflamed surface, but when diluted with three times its quantity of rose ointment, with half a drachm to a drachm of oxide of zinc in the ounce, it forms one of the most valuable anti-pruritics possible in eczema. Made thus it can be applied even upon a very young child and with the happiest effects.

Bismuth sub-nitrate forms a very good ointment for infantile eczema, used in a strength of half a drachm or a drachm to the ounce. Tannin also acts very happily when there is a dry, red, and somewhat scaly surface. Likewise a weak white precipitate ointment.

In the management of infantile eczema very different results are obtained according to the mode in which applications are made to the diseased surfaces. In general, ointments should be spread upon cloths and laid upon the affected portions if there

is any tendency to exudation. More harm is often done by the efforts of the attendant to rub on the ointment than gain is had from the application itself. If laid on with a cloth all this is avoided; the dressing should of course be renewed occasionally.

In the management of infantile eczema attention should also always be paid to the use of water by the attendants, for most erroneous methods and ways are constantly practised, and the exciting and continuing cause of eczema in the young as well as the old will not infrequently be found in the use of water; sometimes also possibly in the soap employed. The child, then, in whom eczema is developing, should not be freely washed, as if in health, but if washed at all the water should be properly medicated. I generally have it only wiped off, as much as cleanliness actually demands.

If a bath is to be given, I have a mixture of carbonate of potash, carbonate of soda, and powdered borax made, of which from two to four teaspoonfuls are used for each gallon of bath water, together with from two to four teaspoonfuls of dry starch. This is used without soap, and on taking the child from the bath it is immediately dried without friction, and a proper medicament at once applied. If there is tendency to the development of acute papular eczema the whole surface should be well powdered after drying, as with lycopodium powder.

The practice of many is to wash the parts directly affected with eczema; or, as I have known, the advice of the physician was to keep the part well washed and clean. Now this is impossible; at least in eczema in children which is at all acute. As often as the surface is washed, the outer lightly-formed epidermal cells are removed before they have any firmness, and the process of repair is hindered thereby. My constant direction is not to wash a part until I direct it to be done, and in many cases that is very seldom. Occasionally the mass of accumulation becomes so great that the ointment does not penetrate it, and a single washing is of the greatest value in allowing the astringent to come down directly upon the affected surface. I always direct that the application be made in the quickest time possible after the washing, otherwise a new coat of exudate has formed and hardened, and the medicament lies on the top of it and fails of its end.

In children I seldom have parts which are at all acutely involved in the eczematous process, washed more than once or twice a week, sometimes not at all for a much longer time, if necessary. Occasionally when the crusts are quite thick, as upon the scalp, we have a very valuable agent which will penetrate them, namely, cod-liver oil, whose value as a local application in eczema is by no means small.

A word may here be said in reference to the use of poultices in eczema, especially in infantile eczema. In the almost five hundred and fifty cases of eczema in children under five years of age of which I have notes, I believe I can count on the fingers of the hands the number of poultices which have been applied by my direction; I almost never use them, and yet it is the commonest thing for me to hear of others directing them to be used, and, I believe, generally to the detriment of the case. Very rarely, when there is a thick crust which refuses to come away with ointment or oil, a single poultice may be applied for a night, the crusts removed in the morning, and the ointment at once reapplied. Sometimes a second poultice may be required, but very rarely more, and I never have the scalp or other eczematous surface treated continuously with poultices, as is frequently advised.

When eczema has lost its very acute elements, and when under such treatment as has been mentioned we find that it refuses to yield, we may, as in the adult, resort to stimulation, and this if applied correctly will often furnish the best results. I not infrequently use the compound tincture of green soap of Hebra, composed of equal parts of oil of cade, green soap, and alcohol, and find it is of great value; if it is too strong and gives much pain on application, it can be diluted with a little water at the time of using. The surface is to be quickly but firmly rubbed with a cloth damped in it; it is then dried off and the appropriate ointment immediately applied. When this is used, it is far better always to have the ointment laid on a rag, as the extra friction of an application with the finger or otherwise may be just too much.

This compound tincture of soap is a very valuable antipruritic, and will ofttimes arrest the itching excellently. I have not yet mentioned an ointment which is used by many for this

purpose, and that is zinc ointment with a drachm of oil of cade to the ounce rubbed into it. I formerly employed this largely, but for three or four years have used the combination of tar ointment before described, and much prefer it.

Stronger ointments are sometimes called for in infantile eczema, but the danger is rather in the direction of using too strong applications than too weak, for we must ever remember the exceedingly tender delicate organism with which we have to deal. When there is thickening in localized patches which proves obstinate we may often get absorption from one of the mercurial ointments, and I use a good deal the unguentum hydrargyri oxidi-rubri, diluted with three times its quantity of rose ointment; but even this I have repeatedly seen to be too strong, exciting a fresh papular eruption. The citrine ointment, diluted three, four, or more times, will also be well borne where patches are chronic and infiltrated.

I have by no means exhausted the subject, nor have I given all or even most of the remedies and measures which are of daily service in overcoming infantile eczema. To endeavour to do this, and to give indications for the use of each remedy which would be unfailing, would be far beyond the scope and intention of this short paper. The intention was not to exhaust the subject, nor to furnish formulæ for practice, as these may be found in many good text-books.

The desire of the writer was rather to direct attention to what he deems wise to call the management of infantile eczema, rather than its treatment. The object of the paper is to show that arsenic and oxide of zinc ointment are not the only weapons to be employed against this very frequent and very distressing disease; to show that as it depends upon many causes, the measures for its relief must be multiform. Also it is desired to call attention to its frequency, and to the neglect with which it is so often regarded by the physician and consequently by the laity; likewise to the fact that its cure should be and will be, if properly accomplished, followed or accompanied by the improvement in the health of the patient; and that therefore there is absolutely no danger in curing infantile eczema. Finally, the object of this paper is rather to elicit discussion for a further elaboration of the subject.

Reviews.

Clinical Lectures and Essays. By SIR JAMES PAGET, Bart. Edited by Howard Marsh, F.R.C.S. Second Edition. 8vo. pp. 500. London: Longmans, Green and Co. 1879.

It is not necessary for us to review the whole of this book, for by far the greater part of it is little more than a reprint of the first edition. We may therefore occupy ourselves solely with the additions to the present edition, which will be found chiefly to comprise four chapters on "Gout in some of its Surgical Relations." The description of the persons who "explode" with gout whenever they are roughly handled, of the surgical affections which may be produced by gout, of those which may be modified by gout, and of the symptoms by which the gouty modification of an injury or disease may be distinguished, are so graphic, that the reader is almost led to believe it will be as easy for him to diagnose the existence of gout in the realm of surgery as for the author himself. So life-like are they, indeed, and so absorbed do we become in their perusal, that forgetful of where we are sitting, and of the open door behind us, we are suddenly struck with horror at the first symptom of the hideous disease in ourself, a "sense of cold creeping at the spine," and are only reassured by remembering that "the coincidence of many of the lesser signs" is necessary for the diagnosis of gout. The final warning in the fourth lecture, when we are ready to ascribe everything to gout, is worthy of the admirable caution with which Sir James Paget treats every subject. "In this temper of mind study scrofula or syphilis, or any other prevalent constitutional disease, with as much care as you study gout; you may thus find how little wisdom there is in the study of one specialty." We must not forget to thank Mr. Marsh, who has helped us to so valuable an addition to these less known surgical diseases, and whose notes illustrate so well the subjects of the lectures to which they are appended.

The Essentials of Bandaging. By BERKELEY HILL, M.B. London, F.R.C.S. Fourth Edition, Revised, and much enlarged. 8vo. pp. 323. London: Smith, Elder and Co.

THE value of this little book has been still further enhanced in the present edition by various additions and by careful revision. This is particularly the case in the account of Lister's method of antiseptic dressing, a thorough understanding of the use of which is much required by practitioners who are not able to learn it in hospital practice, and to whom therefore the book will be most welcome.

The Cell Doctrine; its History and Present State. By JAMES TYSON, M.D. 8vo. pp. 202. Philadelphia: Lindsay and Blakiston.

IT seems almost incredible that the first recognition of the cell as a physiological unit should have been made by two men still alive, Professors Schleiden and Schwann, for since their memorable discovery the cell doctrine has received such wide development as seem to demand a much longer period than a single lifetime. The cell is not only a physiological, but a pathological unit, and a thorough knowledge of its structure and functions is necessary for the comprehension both of its physiological and pathological processes. Since Schwann first wrote upon the subject numerous ideas have been put forward with regard to cell life, and both practitioners and students are apt to become confused by their multiplicity. In the present work the author has put together in chronological order the various steps in the development of the cell doctrine, and has given a continuous history of its evolution up to its present state. He has succeeded in making the work clear and interesting, and at the same time, by means of a copious bibliography, rendered it complete even for the purpose of those who wish to pursue the study into greater minutiæ than the size of the book would have allowed the author to give in the text. It is a work, the perusal of which will amply repay the reader.

Rabies and Hydrophobia. By T. M. DOLAN, F.R.C.S. Edinburgh. 8vo. pp. 287. Baillière, Tindal, and Cox. Second Edition.

THIS work bears evidence of being the fruit of much thought and research. It is the most complete work of the kind that we have seen, giving the statistics, morbid anatomy, pathology, etiology, and symptoms of rabies, its incubation, frequency of transmission, and treatment. It also gives an account of the geographical distribution of the disease, its history and biblio-

graphy. The chief points in the morbid anatomy, according to the author, are affections of the medulla oblongata, brain, and spinal cord; and in treatment, the encouragement of bleeding from the wound, washing, and sucking it, followed by thorough cauterisation by a hot iron or caustics. The author recommends that suction should be applied instantaneously, without waiting for any apparatus, but he has invented a small glass somewhat resembling in its principle those glasses which are used to extract milk from the breast. *Vide* Note, p. 303. The bibliography is very full, and the work is one which no one interested in the subject of rabies and hydrophobia should be without.

Treatise on Hydrophobia. By J. P. McNeill, M.D., 8vo. pp. 110. London: Henry Renshaw.

This work is much shorter than Dr. Dolan's, and much less perfect. It is not nearly so well adapted for the use of those who wish to study the subject thoroughly, but as it gives briefly and clearly the main outlines of the history, pathology, symptoms, and what is known of treatment, it will perfectly serve the purpose of those who only desire a superficial knowledge of the malady.

Therapeutics, Materia Medica, and Toxicology. By H. C. Wood, M.D. Third Edition. 8vo. pp. 720. Philadelphia: J. B. Lippincott and Co.

In the present edition, a few new articles on salicine, borax, thymol, &c., have been added, but the chief changes are in the descriptions of the actions of drugs which recent advances in pharmacological knowledge have required the author in several instances to alter, and some almost entirely to re-write. These additions increase the size of the work by nearly fifty pages, and the author has done his best to render the work worthy the position it has already obtained as containing the most complete account in the English language of the physiological action of medicines.

Clinic of the Month.

On Enteroclysm as a Therapeutic Method.—Convinced that liquids introduced by the aid of enteroclysm could reach the cæcum, Dr. Cantani had vainly attempted to make them pass so far as the stomach by administering an emetic intended to bring on antiperistaltic contractions shortly after the employment of enteroclysm. Since these experiments were made, two cases (*Il Morgagni,* April, 1879) have shown him the possibility of this phenomenon. The first case was that of a woman, twenty years of age, who suffered from a stercoral congestion of the cæcum, which resisted all treatment, and was accompanied by fits of gastralgia and frequent vomitings, so as to give rise to the supposition that there was an ulcer of the stomach. Daily irrigations with two or three pints of olive oil, by means of enteroclysm, were prescribed. The first irrigations brought with them some hard matter, but the third day, during the application of the enteroclysm, the patient said that she felt the oil rise up and reach the stomach. She was immediately seized with nausea and violent efforts to vomit, and brought up half a pint of oil. The cæcal and epigastric pains ceased immediately as if by magic, and the patient recovered rapidly and completely. In the second case a woman, aged 30, was also treated, without result, by purgatives for a congestion of the cæcum and ascending colon. After the introduction of a litre and a half of oil, by means of enteroclysm, the patient was seized with eructation and vomitings containing oil, after which the pains and the stercoral tumour disappeared entirely. These two cases seem to demonstrate, on the one hand, that liquids can pass beyond Bauhin's valve and reach the stomach by passing the pylorus, and, on the other, that the antiperistaltic movements, the existence of which is denied by some writers, do really exist. It results from these facts that enteroclysm may be used with advantage in feeding patients, since the liquids introduced by this means may reach the small intestine. Alimentary substances, milk having previously undergone artificial

digestion, may be injected into the intestines, and also drinks. This method of alimentation may render great service in trismus, in stenoses of the œsophagus, in affections of the stomach, &c. Cantani also believes that this means is indicated for neutralising in the intestine the abnormal fermentations produced by infective substances. In dysentery and cholera disinfecting injections may be used with the greatest utility. Intestinal worms may also be removed in the same manner when vermifuges are not well tolerated by the stomach. Enteroclysm has already produced prompt cures in many intestinal affections, in the first instance in intestinal occlusions, of which Dr. Perli publishes a new case, followed by cure. Dr. De Dominicis published a case of acute malignant dysentery promptly improved by injections of oil, then by a chloralised and carbolised solution. The tenesmus ceased almost immediately, and the patient soon became convalescent. Dr. Paolucci has also obtained rapid cure of ulcerative colitis of four or five months' standing either primary, or consecutive, on acute dysentery. Dr. Pera has seen a stercoral congestion of the cæcum, with perityphlitis, rapidly yield to injections of oil and soap and water, made by means of enteroclysm. In all these cases ordinary medication had been previously employed without success, and the authors lay stress on the rapidity of the good effects obtained by means of this extremely simple and harmless plan. (*Rev. des Sci. Med.*, Oct., 1879, p. 520; *The London Medical Record,* Nov. 15, 1879.)

Ergot of Rye in Pleuro-pneumonia with Effusion.—Dr. Boggs has prescribed the liquid extract of ergot of Bonjean, with liquor ammonia acetatis, to be taken every two hours in a case of pleuro-pneumonia accompanied by considerable effusion, occurring in a young married woman. The patient rapidly became convalescent, and the favourable result is ascribed by Dr. Boggs to the ergot of rye. No other medicine was employed, with the exception of a mixture of bromide of potash, liquor ammonia acetatis, digitalis and morphia, in some syrup and water; but good Bordeaux wine, brandy and water, milk, beef-tea, &c., were employed as adjuvants to keep up the patient's strength. (*The British Med. Journ.* Nov. 15, 1879.)

Petroleum in Phthisis and Bronchial Affections.—Dr. M. M. Griffith, Bradford, Pennsylvania, writes in *New Preparations:* Dr. M. Milton, of Bradford, several months ago called the attention of the medical profession to the wonderful efficacy of crude petroleum as a remedy in consumption and bronchial affections generally. He has now prescribed the pills made from the dried crude petroleum in about fifty cases with

the most satisfactory results. Bronchial and laryngeal troubles are relieved from the beginning of the first dose. In consumption, it has afforded more satisfaction than any other remedy that he has tried; in several cases of what might be termed incipient phthisis it has effected a permanent cure to all appearances. The crude petroleum is a popular domestic remedy in the oil country for most of the ills that flesh is heir to, but more particularly for coughs, colds, and bronchial troubles generally. The profession will be slow to adopt so simple a remedy as crude petroleum in consumption, but from the testimony now in Dr. Milton's possession from a great number of his medical friends outside the oil country, he has no hesitation in calling the attention of the profession to it as one of the very best means of cure in any curable case of phthisis pulmonaris. The only difficulty he has found has been the difficulty in getting patients to use the medicine in the shape of pills, and the nausea they frequently produce; but by perseverance this is easily overcome. The article which he usually prescribes is found incrusted on the bottom of the tanks, and has the consistency of putty, and is easily made into pills by incorporating it with any vegetable powder. The size of the pills is three to five grains ; one pill from three to five times per day. The cough and soreness of the lungs are speedily relieved, the night sweats are increased. Out of the cases in which he used it, only three derived no particular benefit. They were cases that had about exhausted the Materia Medica, and would not persevere. He has kept notes of twenty-five well-marked cases of incipient tuberculous consumption of the lungs; nineteen of which he considered cured. Three of these are now under treatment: the balance he has lost sight of. He has no confidence in it in advanced or confirmed consumption, where vomicæ have already formed. He thinks it acts by preventing inflammation in the lungs, thereby retarding any further destruction of the lung-tissue. It may act specially on the disease, but this is left for others to investigate. It has proved beneficial in cases of asthma. It has no effect on nasal catarrh, ozæna, &c. (*The London Medical Record*, Dec. 15, 1879.)

Benzoate of Soda in Phthisis.—The treatment of phthisis by the inhalation of benzoate of soda originated in a communication by Dr. Kroczak to the *Wiener medizinische Presse*, September 14, 1879. In this paper the author, who was assistant to Dr. Rokitansky, detailed the exceedingly favourable results which he had obtained in the case of fifteen patients treated in this manner. Dr. Guttmann, repeating these experiments, has been unable to confirm them. The patients were

purposely selected for these observations, whose temperature showed a well-marked hectic type. The inhalations took place twice daily, morning and evening. At first Dr. Guttmann prescribed only 5 grams of benzoate of soda daily, in the form of 100 grams of a 5 per cent. aqueous solution; later he rose, in the case of five patients, to 10 grams of the substance. When a paper appeared from Rokitansky, in which he intimated that his patients had daily inhaled the $\frac{1}{1000}$th part of their body-weight of benzoate of soda in substance, Dr. Guttmann also raised the prescriptions of the patients to that large quantity. Of the thirty-one patients treated, fifteen inhaled during three weeks; one for two days; six for periods varying from fourteen to nineteen days: of these one took 650 grams of benzoate of soda in substance. The remaining nine patients inhaled during three to twelve days. Of these thirty-one patients, nine died. The result obtained was that in no single case—not even in the patients who inhaled daily 1,000 grams of the solution—was the temperature in any observable manner lowered by the benzoate of soda, nor was any influence exerted on the temperature curves. Dr. Guttmann adds that the internal use of benzoate of soda, during a considerable time in which a quantity of about eight grams in substance was taken, was equally without influence on the febrile temperature. On the second notable factor in the progress of phthisical patients, improvement or falling off in weight, the treatment with benzoate of soda was equally without influence. Neither did the local symptoms of the phthisis undergo any change during the course of the treatment in the sense of improvement. Dr. Wenzel reports as the result of treatment of ten cases of phthisis in Berlin, that neither in the more severe nor in the lighter cases was any direct effect produced on the phthisical process by this mode of treatment. Prof. Drasche reports also from the General Hospital at Vienna the results of his employment of benzoate of soda in twenty cases, and these results are equally disappointing. (*The British Medical Journal*, Jan. 3, 1880.)

Precocity.—M. G. Delaunay, in an interesting paper read before the Société de Biologie on December 27th, records his opinion that precocity is a sign of biological inferiority. As a proof of this, the author adduced the fact that the lower species developed more rapidly and were at the same time more precocious than those higher in the scale. Man is of all animals the longest in arriving at maturity, for his brain may increase up to fifty years of age. The lower races of men are more precocious than the higher, as is seen in the children of the Eskimos, Negroes, Cochin Chinese, Japanese, Arabs, &c., who are, up to

a certain age, more vigorous and more intellectual than small Europeans. Prececiousness becomes less and less in proportion to the advance made by any race in civilisation. Thus the French people grow less and less rapidly, and to such an extent is this the case, that the standard for recruits has been twice lowered since the beginning of the century; and the same observation applies with equal force to the Italians. In French society the nobles had, according to Broca, in olden times more capacious heads than the rest of the people; but M. Le Bon now shows that their skulls are at present inferior in capacity to those of scientific men and merchants. Women are more precocious than men, and in all domestic animals the female is formed sooner than the male. From eight to twelve years of age, a girl gains one pound a year on a boy, and in mixed schools they obtain the first places up to the age of twelve. The inferior tissues and organs develop before the higher ones, thus the brain is the slowest of all organs to develop. The anterior and the left superior portions of the brain, which are the seat of the higher faculties, develop at a later period than the other parts. M. Delaunay concludes by stating that the precocity of organisms and organs is in inverse ratio to the extent of their evolution. (*Le Progrès médical*, Jan. 3, 1880.)

The Treatment of Ringworm.—Dr. Alder Smith recommends, as an excellent remedy in recent cases of ringworm, a mixture of carbolic acid (the pure crystals melted) and glycerin in equal proportions, or one part of carbolic acid to three parts of glycerin, according to the extent of surface to which it is applied, the age of the patient, or the effect produced. The glycerin penetrates freely, and carries the acid to the conidia. The application is cleanly, seldom painful, and though it has been used freely for eight years, a toxic effect has only once been produced. The remedy should be applied twice or thrice a day, and should be rubbed in with a mop made by tying a small piece of sponge to the end of a penholder. The treatment will take two or three months to produce a complete cure and to get the new downy hair to grow. When there is a large extent of surface involved, Dr. Alder Smith uses the following ointment: Pure carbolic acid, strong citrione ointment, and sulphur ointment in equal parts; to be made fresh every day. This can be applied without fear, at any rate to children over ten, to the entire scalp every night, and to the patches again the next morning. The ointment causes no pain and is very effectual. (*The Lancet*, Jan. 10, 1880.)

Collodion in the Treatment of Diseases of the Ear.—Dr. McKeown believes that there is an analogy between

the action of collodion on the ear, and that of atropin and iridectomy on the eye. Thus as atropin prevents adhesions and breaks them up, thereby saving the eye from repeated attacks of iritis, so the tightening of the tympanic membrane at the period of attack may save the ear from future danger in a similar way. In like manner too as atropin and iridectomy save the optic nerve from injurious pressure, collodion prevents tension on the acoustic nerve by easing the stapes in the fenestra, and thus the nerve is protected till the tympanic or Eustachian disease disappears. Dr. McKeown considers amongst other questions of aural surgery the treatment of relaxed membrane; the prevention of the adhesion of the membrane to different structures within the tympanic cavity; the rupture of adhesions: the maintenance of the normal relation of the membrane to the ossicles, and of the ossicles to each other: the prevention and relief of labyrinthine pressure: the prevention of the shortening and retraction of the tensor tympani: and the mode of keeping a perforation of the tympanic membrane open for a longer or shorter period. Dr. McKeown believes that the affections here classed together are closely allied in cause as well as in treatment, inasmuch as they all arise directly from a drawing in or pushing in of the membrane of the tympanum, during the course of catarrhs of the Eustachian tube and drum. The first object of treatment is therefore to keep the membrane in position, and to replace it when necessary. The existing methods are insufficient to effect this purpose, since some powerful and slowly acting agent, whose influence will be exerted for long periods, is required. Collodion seems to answer the requisite conditions, for when it is applied to the membrane it adheres tenaciously, contracts considerably, diminishes the concavity of the membrane, and pulls it with the handle of the malleus outwards, increases the resistance of the membrane, and exercises a far-reaching influence on the middle and inner ear. (*The Brit. Med. Jour.*, Dec. 27, 1879.)

To Cure Fits of Sneezing.—Mr. Messenger Bradley recommends that in the incessant sneezing which so frequently accompanies a severe cold the nostrils be plugged with cotton wool. No inconvenience results from the introduction of the pledgets, which should be sufficiently firm not to tickle, and yet sufficiently loose to breathe easily through. (*The Brit. Med. Jour.*, Dec. 27, 1879.)

Iron and Digitalis.—Mr. Livy recommends the use of the tincture of muriate of iron and of digitalis with dilute phosphoric acid. In this combination the phosphoric acid acts chemically by preventing the formation of the tannate of iron, which recurs

when the tinctures are administered alone; and therapeutically by introducing an acid in a pleasant form into the system, and not phosphorus, as is sometimes supposed; since the amount of phosphorus is so minute in proportion as to have little or no therapeutic effect. As an acid it aids the astringent action of muriate of iron, and is of value in cases of gastric complication where acids are indicated. The more common form of prescribing iron and digitalis is that of the ammonio-citrate of iron and tincture of digitalis, in which case an almost similar effect is produced on the heart and blood system, without the astringency of the muriatic and phosphoric acids, rendering it valuable in cases of gastric irritability. The absence of the phosphoric acid from the acid preparation causes the mixture to be unsightly and unpleasant. (*The Brit. Med. Jour.*, Dec. 27, 1879.)

The Topical Uses of Ergot.—Dr. W. C. Dabney, in an article in the *American Journal of the Medical Sciences*, July, 1879, calls attention to the local use of ergot in various affections. In chronic conjunctivitis, in which the vessels are enlarged and tortuous, he advises the frequent cleansing of the eye with warm water, and the instillation after each washing of a few drops of the following solution:—Ergot (solid extract) gr. x., glycerin ʒi.; water to make ℥i. This treatment is less applicable in cases in which there is much pain or intolerance of light. In pterygium the same solution may be used with advantage. In cases of pharyngitis, when the vessels are enlarged and tortuous and there is not much secretion, and in hypertrophy of the tonsils, the following solution should be painted on the parts twice a day:—Ergotin, gr. xx.; tincture of iodine, ʒi.; glycerin to make ℥i. In cases of cervical metritis, ergot and belladonna may be combined in the following proportions to form pessaries:—Ergotin (or solid extract of ergot), gr. xx.; extract of belladonna, gr. ii.; cocoa butter, q. s., mix and make into six pessaries; one to be inserted into the vagina every night, after using the hot douche. In warm weather these remedies may be dissolved in glycerin and water, as in this formula:—Ergotin, gr. iii.; extract of belladonna, gr. vi.; water and glycerin, āā ℥iv.; mix. A pledget of cotton is to be saturated with this solution, and inserted into the vagina at bed-time, after the hot douche; the cotton should be removed in the morning. Dr. S. Eldridge mentions in the *New York Medical Journal*, October, 1879, several other affections in which the local application of ergot is beneficial. He treated an obstinate case of acne rosacea, occurring on the nose of a young lady, by the use of ergotin, applied during the night upon lint; in three weeks there was much improvement, and in six months no trace of the disease was visible.

In another case of the same affection, due to drinking, he injected two or three minims of the following preparation of ergotin into the substance of the skin at intervals of three days, having first softened the tissues as much as possible by several days' continuous poulticing:—Ergotin, gr. xv.; glycerin, gr. xxx.; water, ʒii.; thoroughly triturate and strain. No suppuration occurred. Thirty injections were made, and in four months the nose was almost natural in appearance. Dr. Eldridge also gives details of some cases of gonorrhœa and granular urethritis which he has treated by ergotin locally, with marked success. The remedy may be introduced into the urethra either by means of the ointment syringe or rubbed into the meshes of a cylindrical hollow lamp-wick, which is supported by a small bougie passed into its centre, this swab being allowed to remain in the urethra for about half an hour. In an old standing case of otitis media, accompanied by destruction of the membrani tympani, large granulations, and profuse discharge, ergotin was applied directly with a camel's hair pencil, after having been diluted with sufficient glycerin to make it flow easily; the result was satisfactory, the granulations having shrunk rapidly, while the discharge disappeared and the sensitiveness abated. The author also suggests that in eczema, vaginal leucorrhœa, and nasal catarrh, the topical application of ergotin should prove of value. (*The London Medical Record*, Jan. 15, 1880.)

Treatment of Acute Bronchitis.—After a large experience, Dr. Bozzi states that the following receipt is very effectual in cases of acute bronchitis:—

> Sulphuret of Antimony, 1 gram.
> Dover's powder, 1 gram.
> Powdered sugar, 3 grams.

Mix and divide into ten parts. One powder to be taken every three hours, but not more than four in the twenty-four hours. The same prescription is useful in the acute stage of chronic bronchitis as well as in the symptomatic bronchitis of heart and lung diseases. The diet should be restricted to warm and sweetened milk, and to chicken broth; whilst the room temperature should not fall below 12° Réaumur. (*Le Progrès médical*, Jan. 31, 1880.)

Iodoform in Nasal Catarrh and the Treatment of Wounds.—Dr. Albert Wilson finds that iodoform is very useful in cases of post-nasal catarrh. He has tried the remedy in a large number of cases with great success. The coryza and accompanying pain and discomfort disappeared in a few hours, or in the course of a night. In cases of a mild catarrh, however,

iodoform aggravated the symptoms. The method of treatment was to snuff up each nostril about as much of the powder as would lie upon a threepenny piece. One application is enough. Iodoform has also been used with success in the treatment of wounds. It is especially useful in strumous subjects, when the wounds do not seem inclined to heal. In antiseptic cases, the powder is to be mixed with a carbolic acid solution of strength 1 in 40, to render inert atmospheric dust which may be mixed with it. It is also very useful in cases where there are sloughs; the sloughs rapidly disappear, and the wound becomes clean and healthy. Dr. Hack has recently shown the absorbing power of granulations, and that they will absorb aseptic sloughs. This latter fact was originally pointed out by Prof. Lister, not only in regard to aseptic sloughs, but also in some cases to aseptic necrosed bone. The iodoform is probably absorbed by the granulations, stimulating them to absorb the slough much more rapidly. In these cases Dr. Wilson has noticed that the sloughs disappear without alteration in their extended surfaces, and without increased discharge. They are in fact absorbed from the under surfaces, which lie in contact with the granulations. In painful burns an ointment containing iodoform soothes the pain, whilst the powder sprinkled on gives very great pain. The author concludes by suggesting that iodoform may be of use in obstinate cases of photophobia, employed either as an ointment spread along the lids, or as a snuff. (*The British Medical Journ.*, Jan. 31, 1880.)

Extracts from British and Foreign Journals.

Salves of Salicylic Acid in Eczema.—Dr. Von Genzer recommends their use, in the strength of 4 to 100, in the moist eczemas of children, and in intertrigo. Under their use the affected parts soon become dry, and the skin paler and scaly. (*Central. Zeit. für Kinderheilk.* 1879, p. 323.)

Treatment of Intertrigo in Infants.—Dr. Ad. Wertheimer recommends that powders should be applied to the skin only when the epidermis is sound; when there are excoriations, unguent. diachyli renders good service in recent cases. Sometimes it fails, and then corrosive sublimate, gr. j to ℥ iv should be frequently applied. (*Deutsch. Archiv. für Klin. Med.* Bd. 21 Heft. 3)

Pyrogallic Acid in Psoriasis.—M. C. Mook (in the service of M. Vidal) uses this remedy in the strength of 1 part to 10, and states that it never produces the inflammatory phenomena which so often follow the application of chrysophanic acid or oleum cadini. It does not discolour black hair, although it turns blonde hair brown, and is destitute of odour. (*La France médical*, 1879, p. 425.)

The Physiological Action of Iodoform.—A. Högyes describes, in the tenth volume of the *Archiv. für Experimentalle Pathologie*, some experiments which he has made with iodoform on herbivora and on carnivora. He finds, with Binz, that iodoform given in poisonous doses produces fatty degeneration of the heart, liver, and kidneys, and that the animal dies with symptoms of general paralysis; that it has a narcotic action on dogs and cats, but not, even when given in lethal doses, on rabbits and frogs. He disagrees, however, from the view of Binz that the iodoform enters the circulation in the form of a fatty solution, whether introduced by inunction or dissolved by the fat of the part where it is applied; it then undergoes disintegration in the blood, the nascent iodine seizing on the albumin

of the cells. From the experiments on the changes which iodoform underwent when it was introduced into the blood, though some parts—the intestinal canal, skin, subcutaneous connective tissue, serous cavities, &c.—when the iodine appeared in the urine, he finds that when a solution of iodoform is carefully injected by a Pravaz's syringe into the abdominal cavity of a rabbit or cat, care being taken that none of it escapes into the abdominal wound, neither the sweat, nor the urine, nor the air expired after tracheotomy, contains any iodoform, provided that the atmosphere be kept free from it. In the blood of dogs and cats, taken from various parts of the arterial system or from the right auricle, after narcotism had been produced by iodoform, there was no odour of this substance. According to Högyes, iodoform enters into solution in the form of a compound of iodine with albumin; that is to say, when iodoform is applied undissolved, it is dissolved in the fatty materials of the part. From this solution, or when it is applied in combination with fat or oil, the iodine is set free and combines with the albumin of the tissues of the part. Iodine albumin made by adding iodine dissolved in a little iodide of potassium to the white of hens' eggs, produced narcotic symptoms in dogs and cats, but not in rabbits. In the latter, the fatty degeneration of the liver and kidneys was less marked. A similar formation of iodine albumin takes place, according to Högyes, when a solution of iodine is injected under the skin or into the serous cavities; its general effects, however, are those of simple poisoning by iodine, nausea, and general emaciation. There is no narcosis, even in cats; and the advanced fatty degeneration characteristic of iodoform poisoning is absent. (*The British Med. Journ.*, Oct. 25, 1879.)

Treatment of Urticaria by Atropia.—Dr. Frænkel, in 1876, recommended the internal administration of atropia in the treatment of severe forms of urticaria. Dr. Schwimmer now reports three cases of this affection which, after proving rebellious to all the usual modes of treatment, were rapidly cured by atropia. These three cases show, however, that the atropia does not prevent relapses. Dr. Schwimmer believes that urticaria is simply an angio-neurosis, and ascribes the efficacy of the drug to its action on the sympathetic system. (*Le Lyon médical*, July 17, 1879; *The New York Medical Record*, Sept. 6. 1879.)

A Case of long-continued Priapism.—Dr. Salzer, of Worms, publishes a case which has recently occurred in his practice of a patient, aged 46, who presented, for a period of seven weeks, the pathological phenomenon of well-marked priapism.

The patient awoke one morning with a strong erection which could not be reduced by any means, and which was accompanied by severe pain. Leeches, warm applications, hydrate of chloral, and even chloroform narcosis itself, failed to afford relief. The urine was voided with difficulty in jerks, and with the greatest comfort in the knee-elbow position. On examination, the only condition discoverable was a marked enlargement of the spleen, due to a previous attack of intermittent fever. The penis was enveloped for three weeks, day and night, with strong camphorated narcotic poultices, whilst camphor and opium were administered internally. At the end of this time the erection gradually declined, after lasting for seven weeks. The patient became weaker, and of a cachectic constitution. Two months later the spleen measured in the linea axillaris 18 cm. in thickness, and there was total loss of erectile power, accompanied by absence of the sexual instinct. Four months later the enlarged spleen extended to the umbilicus. No histological examination of the blood was made. The patient died about a year after the onset of the priapism. A post-mortem examination was refused. The author appends short abstracts of eight similar cases, accounts of which have already been published. From these it appears that priapism is to be considered as one of the symptoms of leukæmia, in spite of the fact that it only rarely occurs. The cause of the priapism in patients suffering from leukæmia has been explained in various ways. Kremme believes that it is produced by the effusion of blood into the corpora cavernosa, and is thus caused by the impeded return of the blood. He finds that it corresponds to the bleeding from the nose and rectum which sometimes occurs. Longuet regards the physico-chemical condition of the blood in leukæmic patients as the cause of the priapism, and considers that the circulation of the blood is hindered in the smaller vessels, whilst thrombi are formed, owing to the great increase in the number of white blood corpuscles. Neidhart and Matthias concluded that the origin of the affection might be sought in the disturbance of the nerve centres. In the case here given, however, the erection occurred in the person of a man who was previously healthy to all appearance, and who had never suffered from previous hæmorrhage. Upon this and other grounds, Dr. Salzer rejects the theory that the priapism was due to extravasation of blood. He is more inclined to adopt the theory last given, and to suppose that the attack was due to stimulation of nervi erigentes, brought about either by anatomical changes in the nerves themselves, or by pressure upon them from enlarged lumbar glands. (*Berliner klin. Wochenschr.*, No. 11, 1879; *Med. Chir. Rundschau*, June, 1879.)

Pneumatic Therapeutics in the Treatment of Diseases of Children.—The softness and elasticity of the thorax in children offers, says Dr. Hauke, a good field for these therapeutic manipulations in cases where such pneumatic treatment is indicated. The indications are more frequent in children than in adults, owing to the relative narrowness of the respiratory passages and to the weakness of the muscles. The means adopted must naturally be of such a kind that the act of inspiration is performed without the assistance of the little patient, or even against his will. This result is best obtained, according to the author, by the use of a pneumatic cuirass or fan ("Wanne"), a kind of air-tight shirt, with only an opening at the end nearest the head, which is connected with a pneumatic apparatus. Experiments upon the dead subject have demonstrated that by means of this machine the natural respiration can be imitated. Accidents which might occur from the use of this instrument, such as subpleural emphysema, the filling of the stomach with air, &c., can be prevented, it is stated, by the use of a body belt, and by not rarefying the air so much as to cause them. The process itself consists briefly in rarefaction of the air within the cuirass to such an extent that the atmospheric air enters the lungs in larger quantities than in normal inspiration. The ordinary atmosphere pressure is then allowed to return suddenly, and the expiration is, in consequence, proportionally more energetic. Parts of the lung which, before the *séance*, were dull on percussion, gave afterwards a clear resonance. These results, however, according to the histories here given, were not usually persistent, and there was marked improvement in only a very small number of the cases subjected to pneumatic treatment. The author gives the following as indications for the adoption of this method:—1. Asphyxia in newborn children. 2. Congenital atelectasis. 3. Catarrhal pneumonia. 4. Chronic stationary pleuritic effusions. 5. Croup. The author admits that the results did not come up to his expectations in this disease, but states that all the cases were diphtheritic in character. 6. Rickets; by the mechanical assistance thus afforded to respiration, the abnormal form of the thorax is corrected or prevented. (*Jahrb. f. Kinderheilk.* N. S., xiii., p. 263; *Centralblatt f. die med. Wiss.*, June 21, 1879.)

Observations on the Digestion of Milk.—Dr. Brush divides milk into two distinct classes, according as it is the product of ruminant or non-ruminant animals. The milk of ruminants contains a variety of casein which coagulates into a hard mass under the action of the digestive ferment, or during lactic fermentation. From this fact the cause of the difficulty experi-

enced by the human stomach in digesting the milk of ruminating animals is readily accounted for. The other variety of milk, viz., that afforded by the non-ruminant animals, does not, under the action of rennet or acids, coagulate into the hard mass which is found in the cow's milk, but forms small granular or flocculent masses which are easily diffusible. This observation explains simply the advantages of koumyss prepared from cow's milk, over the milk itself, in the artificial feeding of children. In koumyss the casein is coagulated, and afterwards subdivided ; it is then incapable of further coagulation under the action of any acid or ferment. It is also found that the amount of casein in milk is always in inverse proportion to the amount of sugar present, and the milk of ruminants contains a smaller amount of sugar, but a larger amount of casein than that of the non-ruminants. The less sugar too that a given variety of milk contains the more rapidly does lactic fermentation take place, and consequent putrefaction follow. A milk containing a large amount of sugar, however, will undergo alcoholic fermentation, when placed under those conditions which would be the most favourable for lactic fermentation in a milk containing a small amount of sugar. The bearing of this observation is that putrefaction follows lactic fermentation, whereas alcoholic fermentation precludes to a certain extent any form of putrefaction. Thence the value of koumyss in the artificial feeding of children, for the sugar which it contains is all changed into alcohol and its associates, which at this period of life, when properly administered, is a true food. (*New York Medical Journal*, Sept., 1879.)

Treatment of Carbolic Acid Poisoning.—Drs. Langenbuch and Sonnenburg have referred to the dangerous results that are liable to follow the use of carbolic acid in antiseptic surgery. It is in the case of children especially that this danger is to be apprehended. According to Sonnenburg, adults suffer chiefly from nausea, vomiting, and headache, whilst in the case of children there is collapse, often preceded by restlessness and excitement. During the stage of collapse, there may be a fall of temperature in children to 34° C. In the lighter grades of poisoning the temperature may rise to 39° C. Sometimes these conditions end in death. In these cases the examination of the urine is very important, inasmuch as it enables one to determine whether or not carbolic acid poisoning is setting in. Baumann has shown that a disappearance of the sulphates from the urine goes hand in hand with the development of the symptoms of carbolic acid poisoning, whilst the quantity of associated sulphuric acid is at the same time increased. When the poisonous symptoms reach their height, the sulphates will be found to have entirely

disappeared. Baumann has further shown that if sulphate of soda is administered to animals suffering from symptoms of poisoning by carbolic acid, non-poisonous phenol-sulphuric acid is produced, so that sulphate of soda or any soluble sulphate is a direct chemical antidote to carbolic acid. Sonnenburg gives a list of cases in which symptoms of poisoning followed the use of carbolic acid, and in which the sulphate of soda was administered. In some of these cases the grade of poisoning was so high that the urine had the dark colour characteristic of this form of poisoning, and the sulphates were entirely wanting. The general results of the treatment were that the bad symptoms disappeared, the urine became normal, and it was possible in most cases to continue the dressings as before. The dose which is recommended for adults is a tablespoonful every half hour of a solution containing five parts of the sulphate of soda in one to two hundred parts of water; for children the same amount of a solution containing four parts in two hundred. Lately Dr. Sonnenburg has made the discovery that in these cases of poisoning repeated dressings with a five per cent. solution of sulphate of soda are a very efficient antidote. The urine, which at first is of a dark green colour, with a slight brown tinge, soon assumes a normal colour, when the dressings with carbolic acid may be resumed without danger. (*Berliner klin. Woch.*, No. 28, 1878; *Deutsche Zeit. f. Chir.*, vol. ix.; *Ber. deutsche chem. Gesellsch.* ix. i.; *Med. Chir. Centralbl.*, March 21, 1879; abstracts in *The Boston Medical and Surgical Journal*, Aug. 21, 1879.)

Physiological action of Ozonised Air.—Dr. John Barlow has repeated and modified some of the experiments with ozone, to settle if possible the discrepancies which exist as to its mode of action. There exist at present two opinions as to ozone, for some regard it as a gas which may be breathed in considerable quantities without producing any permanent injury, whilst others believe that it produces marked symptoms, and even death. Among the latter class of observers there is a difference of opinion as to the cause of death, whether it is due to asphyxia or to bronchitis, or to some special action on the blood and nervous system, and also as to the effect of breathing ozone upon the character and frequency of respiration. From the symptoms which Dr. Barlow has observed in guinea-pigs and rabbits, he is of opinion that the following conclusions regarding the effect of the respiration of ozonised air may be drawn. (1) Ozone depresses the nervous system. This effect is probably a secondary one, and is due to the excess of carbon dioxide in the blood. (2) Ozone diminishes the number of the normal respirations, and as a result of this, diminishes in force and frequency the action of the

heart. (3) That inhalation of ozonised air produces a diminution in the normal amount of carbonic acid eliminated, and in the amount of oxygen absorbed. (4) That the diminution of the number of respirations, the diminished action of the heart, and the diminution in the amount of carbon dioxide excreted, are probably caused by the ozone affecting the character of the pulmonary mucous membrane. (5) That the alteration of the pulmonary mucous membrane by ozone may be, if the ozone is present in large quantities, or if the air breathed by the animal contains a large excess of carbonic acid, sufficiently marked to produce death from asphyxia within an hour. (6) If the proportion of ozone in the air be less, the alteration of the pulmonary mucous membrane may not cause death from asphyxia, but may cause death from bronchitis. (7) That the inhalation of an atmosphere containing one part in one hundred parts by weight of air, for an hour, will probably cause death from bronchitis. (8) That ozonised air brought into direct contact with the blood produces decolorisation of the red blood corpuscles, stops the amœboid movements of the white blood corpuscles, renders the nucleus of the corpuscles apparent, and causes the appearance of granules in the liquor sanguinis. (9) That this change in the red blood corpuscles is probably due to the union of the ozone with the hæmoglobin, as a result of which a colourless compound is formed. (10) That there is no evidence that the respiration of ozonised air produces a diminution in the amount of ozone in the air; nor is there any evidence that in the breathing of ozonised air the ozone enters the circulation. Dr. Barlow further believes that the inhalation of ozonised air in pulmonary affections is a method of treatment which should be very carefully, if at all, employed, and that the inhalation of ozonised air, having for its object the absorption of ozone into the blood, cannot at present be advocated, inasmuch as ozone is not absorbed, and cannot therefore be of service in increasing the existing power of the blood. (*The Journal of Anat. and Physiol., Normal and Patholog.*, October, 1879.)

Experimental and Anatomical Investigations on Erysipelas.—Dr. H. Tillmanns, of Leipsic, has endeavoured to ascertain whether it is possible to transfer erysipelas from diseased to healthy persons by means of fluids taken from the erysipelatous area. Of twenty-five attempts to convey erysipelas by direct inoculation to healthy animals, a positive result was obtained in five. Rabbits inoculated with lymph-blood, contents of vesications, or pus taken from men affected with erysipelas within the diseased area, were affected by a disease in no way to be distinguished from the erysipelas of

human beings. Such cases only were assumed as satisfactory in which, besides typical, migratory, diffuse redness and swelling and general feverishness was also plainly to be recognised. In one instance, after inoculation with the contents of a bulla of erysipelas, which in other experiments induced a well-marked fever, an abscess, accompanied by increased temperature and diarrhœa, appeared at a distance from the point of inoculation, burst spontaneously, and soon healed. This appeared to be analogous to the cases in which, after slight abrasions on the fingers, erysipelas showed itself on the elbow or upper arm, or when an apparent primary erysipelas of the face arises where there has been a previous superficial lesion of continuity in a neighbouring mucous cavity. As regards the term of incubation and the form of commencement in four of the five cases, redness and fever were simultaneously established twenty-four hours after inoculation. In the fifth the local symptoms came on first forty-five hours after puncture, the fever twenty-four hours later. In all the successful cases the inoculated fluid contained bacteria. From this it appears that erysipelas is a transmittable and moderately contagious disease, and that the poison remains confined to the erysipelatous area. The author also found that the addition of a 2·4 per cent. carbolic acid solution rendered a previously active erysipelatous inoculating fluid quite inefficacious. Dr. Tillmanus considers that the occurrence of bacteria in fluids from the tissues and in the tissues is no more a constant feature in erysipelas than septicæmia. It is thus possible that every case of erysipelas is not caused by the migration of bacteria as such, and that the advance of erysipelas is not connected with the presence of micro-organisms. (*Schmidt's Jahrbuch*, No. 6, 1879; *The Edinburgh Med. Journ.*, January, 1880).

ERRATA IN THE ARTICLE ON PEPSIN &c., IN THE MARCH NUMBER.

Page 198, line 30, *for* "quality," *read* "quantity."
" 199, Table I. No. 9, *for* "(Boudalt)," *read* "(Boudault)."
" 199, last line of foot-note, *for* "Nos. 8 and 9," *read* "Nos. 6 and 7."
" 200, Table II. No. 8, *for* "(Boudalt)," *read* "(Boudault)."
" 201, line 16, *for* "the experiments in Table I. page 199, &c., *read* the experiments in page 197," &c.

Notes and Queries.

Capri as a Health Resort.—In the *Practitioner* of February we were anxious to avoid giving a too glowing account of the island, and in our anxiety it appears that we have done injustice to an Italian physician of Capri, Dr. Cerio. We observed that one of the disadvantages of the island was the want of a resident English physician, and no doubt, to many English invalids this is a disadvantage, but, on the other hand, we have received several communications from English visitors to Capri, who have been treated by Dr. Cerio, and they express themselves most gratefully, and, indeed, enthusiastically in his favour, praising in the highest terms not only his kindness but his skill, and considering it a most fortunate thing for visitors to the island that a medical man of Dr. Cerio's ability should be resident in it.

Bishop's Effervescent Citrate of Caffeine.—We have received from Mr. Burroughs a specimen of this preparation, containing one grain in each drachm. It is an exceedingly convenient and pleasant mode of administering the remedy in cases of headache. The addition of the effervescent is likely to render the medicine more efficacious, and it will not interfere with, but rather assist its action as a diuretic.

The Virus Extractor.—This little apparatus has been designed by T. M. Dolan, F.R.C.S., Edin., for the prevention of hydrophobia. It consists of a small glass funnel with a tube attached. The open end of the funnel is placed upon the wound, the air is sucked up through the tube, and any blood or fluid which may enter the funnel from the wound is prevented from reaching the mouth of the operator by a glass bulb into which it falls. For small bites the apparatus will be most efficient, but the india-rubber tube by which the mouthpiece is connected with the funnel ought to be of much stronger material than in the specimen supplied to us, as the walls collapse completely when the air is partially exhausted. The precaution of using this tube may not be absolutely necessary in cases of hydrophobia, but it can do no harm, and certainly may prove very useful in cases of snake-bite by preventing any danger to the person applying suction to the wound.

Department of Public Health.

BUCK ON HYGIENE AND PUBLIC HEALTH.[1]

THE work noted below is a striking illustration of the activity and energy which has of late years been imported into hygienic and public health matters in the United States of America. American literature is not rich in independent works on hygiene and public health, but any reproach which might attach to it on this account may be regarded as effectually removed by the volumes now before us. Dr. Buck, the editor of the American translation of Ziemssen's *Cyclopædia of Medicine*, has judiciously substituted this treatise, specially designed for the American reader, for the volume of that great work which relates to public health, as it treats the subject almost entirely from a German standpoint, and is, as a rule, inapplicable to the state of things existing in the United States. In making this change Dr. Buck has had the co-operation of many of the most distinguished hygienists in the United States, and has produced a work which will hold a foremost place among works on public health in the English language, and which will prove as full of interest and as valuable to readers and sanitary workers on this side the Atlantic as it must prove to readers and sanitary workers on the other side.

After an Introduction, the work is divided into four principal parts, the several subdivisions of which are written by different writers, each subdivision forming an independent

[1] *A Treatise on Hygiene and Public Health*, edited by Albert H. Buck, M.D., American editor of Ziemssen's *Cyclopædia of the Practice of Medicine*; Instructor in Otology in the College of Physicians, New York, &c. Two vols. large 8vo. pp. 792, 657. New York, W. Wood and Co.; London, Sampson Low and Co, 1879.

treatise. The work thus forms a veritable and separate Cyclopædia on the subjects to which it relates within the greater Cyclopædia of which it avowedly forms a part. We cannot pretend to do more, in these pages, than give such a general account of the contents of the two volumes as may tend to whet the appetite of our readers for them.

The Introduction is from the pen of Dr. John S. Billings. It is devoted to an examination of the scope and utility of hygiene, the causes of disease, and the jurisprudence of hygiene. It is rare to find subjects of this class dealt with so readably and so philosophically. He takes exception to the usual definitions of hygiene as inadequate, and regards it, in a broader sense, as including the " examination of the conditions which affect the generation, development, growth and decay of individuals, of nations, and of races, being on its scientific side co-extensive with biology in its broadest sense, including sociology rather than with physiology merely, as some writers state." In regard to the causes of disease, Dr. Billings dwells at considerable length upon recent views as to the intimate pathology of contagious diseases, and his review of the abstruse questions to which they have given rise will be read with much interest. With reference to the question of the jurisprudence of hygiene, he shows, incidentally, how very much has still to be done in the United States before any general recognition of public health duties among the several States can be affirmed. But nineteen of the thirty-four States would appear to have, as yet, Boards of Health, and very much of the legislation as regards these Boards, he tells us, is "merely theoretical, and has no practical application."

The first principal part of the work is devoted to Individual Hygiene, and the first subdivision of this part to *Infant Hygiene*, written by Dr. Jacobi, Clinical Professor of Diseases of Children in the College of Physicians and Surgeons, New York. We apprehend that few subdivisions of the work will have greater interest than this. Although the material is professedly largely drawn from Gerhardt's *Handbuch der Kinderkrankheiten*, the special experience of the writer is very considerably drawn upon, and it is especially on the points to which this experience refers that interest will be mainly excited

here. We particularly refer to the detailed care to be given to the infant and to the feeding of the infant, with particular reference to the burning question of infantile diarrhœa. On the last-named question the experience to be derived from the United States is invaluable; and this experience has probably never before been set forth in so clear and striking a light as by Dr. Jacobi in the article under consideration. We may not dwell upon the various articles of food in use for infants other than breast milk, particularly on the use of condensed milk, or the habitude of giving too much fatty and saccharine matter, or the mode of feeding, and so forth. In passing, we cull one example of the sort of wisdom which abounds in the article, and which needs to be as much insisted upon in this country as in the States. "Infants, as a rule, are not given water to drink. We moreover know that in the first *four* months of their lives but little liquid is secreted in the mouth which might have a local effect on the stomach. Thus we can say positively, that infants are very much more *liable to have too little water in their food than too much.* This is the most important reason why the food of infants should be given in great dilution—in greater dilution certainly than the usual rules found in the books would permit. At all events, it is well that children should have plenty of water in their food. We must not forget that, as a rule they obtain it only in milk. No matter whether it be winter or summer, hardly ever is there a mother or a nurse who imagines that a child can be thirsty without being hungry at the same time. Much discomfort and a good deal of sickness is a result of the fact that infants must eat in order not to be thirsty, because an over-exerted and disordered stomach will not accept any more food. This has been the reason why in the rules and regulations for infants as published by the New York Board of Health for the last half-dozen years, I have impressed upon the minds of mothers the necessity of now and then giving some water to their children." (P. 113.) The principles as to feeding set forth by Dr. Jacobi, and for which we must refer to the article, are given practical form in the following instructions prepared by him for general use by the New York Health Board.

"I. About Nursing Babies.

"Over feeding does more harm than anything else. Nurse a baby of a month or two, every two or three hours.

"Nurse a baby of six months and over, five time in twenty-four hours, and no more.

"When a baby gets thirsty in the meantime, give it a drink of water or barley-water. No sugar. In hot weather—but in the hottest days only—mix a few drops of whisky with either water or food, the whisky not to exceed a teaspoonful in twenty-four hours."

"II. About Feeding Babies.

"Boil a teaspoonful of powdered barley (grind it in a coffee-grinder) and a gill of water, with a little salt, for fifteen minutes; strain it, and mix it with half as much boiled milk and a lump of white sugar. Give it lukewarm through a nursing bottle.

"Keep bottle and mouthpiece in a bowl of water when not in use.

"Babies of five or six months, half barley-water and half boiled milk, with salt and white sugar.

"Older babies more milk in proportion.

"When babies are very costive use oatmeal instead of barley. Cook and strain.

"When your breast-milk is half enough, change off between breast-milk and food.

"In hot summer weather, try the food with a small strip of blue litmus paper. If the blue paper turns red, either make a fresh mess, or add a small pinch of baking-soda to the food.

"Infants of six months may have beef-tea or beef-soup once a day, by itself or mixed with the other food.

"Babies of ten or twelve months may have a crust of bread and a piece of rare beef to suck.

"No child under two years ought to eat at your table. Give no candies; in fact nothing that is not contained in these rules, without a doctor's orders."

Food and Drink, the second subdivision of the first part, by Dr. James Tyson, Professor of General Pathology and Morbid

Anatomy in the University of Pennsylvania, is an admirable systematic statement of our knowledge on the subject; so also is Professor Dr. Ripley Nichols' article on *Drinking Water and Public Water-Supplies,* which forms the third subdivision. Writing of the self-purification of running streams which receive sewage and other filth, Prof. Nichols remarks in his concluding paragraph on the subject,—"It would appear from what precedes, that there is a liability of overrating the amount of spontaneous purification to which a running stream is subject, and it is certain that we cannot decide with confidence as to when a stream, once polluted, becomes fit to drink; moreover, as it is not possible by any practicable chemical treatment or by any process of filtration to make a polluted water wholesome, it is safer not to use, as a source of domestic supply, a water which is known to have been seriously polluted." (P. 284.)

The fourth and fifth subdivisions of the first part relate respectively to *Physical Exercise* and the *Care of the Person,* the first-named by Dr. A. Brayton Hall, of New York City, the last-named by Dr. Arthur van Harlingen, Chief of the Clinic for Diseases of the Skin, in the Hospital of the University of Philadelphia. These are subjects rarely adequately treated in European works on hygiene and public health. Both subjects are very carefully treated, and it is consolatory to find, while we are all agog about the Oxford and Cambridge boat-race, that Dr. Brayton Hall has no very serious argument to bring against it on the physical score.

Part II. of the first volume of the work is devoted to *Habitations,* and here are treated *Soil and Water,* by Dr. Wm. H. Ford, President of the Board of Health, Philadelphia; the *Atmosphere,* by Dr. D. F. Lincoln, Boston, Massachusetts; and the *General Principles of Hospital Construction,* by Dr. Francis H. Brown, also of Boston, Massachusetts. Dr. Ford's article is an elaborate examination of the soil and water in relation to health, in other words to the house. It will be somewhat disappointing to English readers, as it is very largely founded upon European experience, and the subject in the various ramifications through which it is followed is one from which we had anticipated to learn a good deal from American experience. We are accustomed to set a high value on American ingenuity, at

least in constructional matters relating to closets, the internal fittings of houses in relation to drains, &c., but there is little indication of this in the article. Especially we are disappointed with the account of systems other than the water-system of excrement disposal. In regard to the so-called "dry-systems," which seem to be so peculiarly applicable to a large number of American towns and villages, we had hoped to learn much that was new on this subject—a subject peculiarly calculated to stimulate American ingenuity, but here the work is barren; and it would seem as if the United States was still dependent upon European experience in the matter. Dr. Lincoln's article on the Atmosphere is excellent throughout, and here, in regard to ventilation and heating, notwithstanding a disposition to use almost wholly European experiences, we get some useful inklings of American practice and experience. Dr. Brown's article on Hospital Construction is disappointing. The United States has surely sufficient home material in regard to hospitals without having to come so far a-field for illustrations. Not that the article is not good, but so much of it as is derived from United States experience makes the reader wish for more from the same source. Of course it will be said the work is a text-book designed for American readers and must take accepted standards. We don't defend our disappointment. We merely note it.

The second volume of the work is also divided into two principal parts. The first of these relates to *Occupation*, and is subdivided into five parts.

The first subdivision relating to the *Hygiene of Occupation* by Dr. Roger S. Tracy, Sanitary Inspector of the Board of Health, New York, is a capital article on the subject, sufficient of itself to secure the work a welcome here.

The second subdivision, relating to the *Hygiene of Camps*, by Dr. Charles Stuart, is an admirable article founded chiefly on the experiences of the great war of secession, and should prove of especial value to our volunteer forces.

The third subdivision on the *Hygiene of the Naval and Merchant Marine* supplies a great want in the hygienic literature of this country. It is from the pen of Dr. Thos. J. Turner, Medical Director of the United States Navy.

The fourth and fifth subdivisions are devoted respectively to

the *Hygiene of Coal Mines* and the *Hygiene of Metal Mines,* the former by Mr. Henry C. Sheafer, the editor of the *Miner's Journal,* the latter by Mr. Rossiter W. Raymond, Ph.D., editor of the *Engineering and Mining Journal.* Both articles are excellent.

The second part of the second volume relates to *Public Health,* and is subdivided into eleven sections.

First Dr. Thomas B. Curtis, of Boston, Massachusetts, treats of *Infant Mortality and Vital Statistics.* We regret that we cannot reproduce his statements on the relation of high temperature to the mortality from diarrhœal disease in infants, but we quote his summary of the causes of infantile diarrhœa :—

"Let us sum up the facts relating to the causes of infantile diarrhœa which may be considered as demonstrated, and see if from such data anything can be deduced which may account for the generation of the disease.

"The most severe forms of diarrhœa—such as go by the names of cholera infantum or summer diarrhœa—prevail on a large scale almost exclusively under the following conditions: (1) During very hot weather; (2) In the poor and crowded districts of ill-sewered or unsewered cities; (3) among hand-reared infants of the nursing age. No one of these conditions suffices by itself to produce the disease, the combined action of all three being indispensable.

"Diarrhœa is known to be the most common result of all putrid infections. In cases of severe diarrhœal disease, the bowel-contents themselves are found to give evidence of abnormal putrefactive changes taking place in the intestinal tract. The food which proves deleterious when administered to infants is eminently liable to undergo putrefaction. The other conditions relating to temperature and to filthy surroundings, in the absence of which severe diarrhœal disease does not occur, are manifestly such as favour the development of putrefactive changes. It is therefore inferred that infantile summer diarrhœa results from filth-infection, of which the vehicle is the food administered to the infant," p. 293.

In successive subdivisions the *Adulteration of Food* is treated by Dr. Stephen P. Sharples, of Boston, Mass.; *Public Nuisances,* by Dr. Roger S. Tracy, of New York; *Quarantine* (with

reference solely to sea-port towns) by Dr. S. Oakley Vanderpoel, Health-Officer of the Port of New York; *Inland Quarantine*, by Dr. Herrick, Secretary of the Louisiana State Board of Health; *Small-pox and other Contagious Diseases*, by Dr. Allan McLane Hamilton, Sanitary Inspector of the Board of Health, New York, and Dr. Bache Mc. E. Emmett, of New York City; *Disinfectants* by Mr. Elwyn Waller, Ph.D., Chemist to the Metropolitan Board of Health, New York: *Village Sanitary Associations*, by Dr. Roger S. Tracy, of New York; and *School Hygiene* by Dr. D. F. Lincoln, Boston, Mass.

The least satisfactory of these several articles are those relating to Quarantine and Inland Quarantine. The former article appears to have been written without any adequate knowledge of experience and practice in Europe on this subject and especially in England. When we read that in England "hygienic measures are alone relied on for preventing the ingress of epidemic communicable diseases" (p. 475), we are somewhat startled with the novel information. When we further read of military cordons having "effectually arrested the progress of cholera" on the frontier of Russia; and of cholera having "every year for the past six years," been "jugulated," in other words stamped out, among the pilgrims returning from Mecca," before it gained a footing in Europe" (p. 478), we ask ourselves if we are or have been dreaming. When, moreover, we read in the article on Inland Quarantine, that "Inland Quarantine, a recent variation (of quarantine), is still in the first stage of distinct growth, rude, untaught, savage" (p. 511), we give up the subject as hopeless, but with the consoling reflection that even the two articles in question will scarcely detract from the great and superabounding merits of the entire work.

We congratulate Dr. Buck and his coadjutors on the completion of this most important addition to the hygienic literature not of America only, but of all English-speaking peoples. The work will become an essential part of every well-furnished medical library, and will prove a treasure to the sanitary worker and student.

THE INFECTIOUS AND CONTAGIOUS DISEASES OF CHILDREN:—Instructions regarding the Early Symptoms, prepared by Dr. Delpech for the Use of Teachers of Infant and Elementary Schools in the Department of the Seine.

Abridged and Translated by

J. LAWRENCE HAMILTON, M.R.C.S., &c.

[The Instructions relative to the early symptoms of infectious diseases in children from two to fourteen years of age, of which the following is an abridged translation, were prepared for the use of the teachers in infant and elementary schools, at the request of the municipality of Paris and the Prefect of the Seine. The request was addressed to the Council of Public Health of the Department, and the Instructions were prepared by M. Delpech.]

The teacher or director of the school is urged to give immediate personal attention to any child in the school who may appear ill, or who complains of feeling unwell. In such a case the teacher should specially note the presence of one or more of the following signs:—

(1) Increased temperature of the child's body discovered by the teacher placing his hand upon the sick child's skin, particularly on the chest, armpit, face, or forehead.[1]

(2) Quickening of the pulse, as measured by the aid of a watch, together with hardness of beat.

(3) Shivering. Increased or exaggerated sweating, not being the after-result of exercise, &c.

(4) Great thirst, with loss of appetite.

(5) Tongue more or less white; dry, or red.

(6) A flushed or pallid face.

(7) Increased or diminished brilliancy of the eye.

(8) General weariness and indisposition; sense of fatigue,

[1] It would have been an improvement, perhaps, if every school were required to have a clinical thermometer as part of its appointments, and that the teacher, finding a temperature taken in the armpit of 100° F. or more, should be directed to have such a child medically examined.—J. L. H.

with aching in the loins; headache; drowsiness or excitement; delirium.

The majority of the above-named symptoms will almost invariably indicate the presence of a febrile state.

Any child kept at home away from school for a week or more by its parents should, before returning to its school, bring a certificate of health, signed by a duly qualified medical practitioner.

Infectious Febrile Diseases.

A. *Small-pox* is rarely found in those schools where vaccination is enforced, as the majority of vaccinated children have not yet lost the protective influence of primary vaccination. Whenever possible, the teacher should have all the children over ten years re-vaccinated, especially in times of epidemic small-pox.[1] The popular assertion that during epidemics of small-pox, re-vaccination tends further to develop small-pox is absolutely false.

Small-pox sets in with fever, vomiting, and pains in the loins. After not less than two days, but most frequently on the third day of the illness, there appears—commencing on the face—an eruption of raised spots, more or less numerous, which pass later into pimples or pustules, having a depressed or navel-like centre. These spots terminate in scabs, which should have completely disappeared before the child be allowed to return to school. Before readmission to the school the child should have had two or three baths.

B. *Chicken-pox* is a mild disease, occasionally preceded by fever. It is characterised by successive crops of *blebs*, preceded by red-coloured spots, each new crop being apt to appear towards evening, and is generally accompanied with some accession of slight fever. Chicken-pox is characterised by pea-sized *blebs*, or blisters, filled with a transparent watery liquid, which soon becomes thick, muddy, or bloody, and terminates with scabs. Where the spots on the body are neither numerous nor well marked, the eruption is invariably observed among the hair of the head.

[1] The English regulations as to public vaccination state fifteen years as the age for re-vaccination, or twelve years when there is immediate danger of small-pox. —J. L. H.

C. *Measles* is ushered in with general indisposition, fever, sneezing, weeping, and red eyes, loud noisy cough; occasionally there may be bleeding from the nose and passing diarrhœa. After three or four days' illness, sometimes sooner, an eruption shows itself, first on the chin and face in small irregular rose-red spots, slightly elevated, which soon spread over the surface of the body, leaving more or less pale irregular patches of skin unattacked. The complaint is highly contagious.

Children with measles, when *kept at home*, and not exposed to the chance of catching cold, generally do well.

D. *Scarlet Fever* commences with extreme general indisposition, high fever, a dry burning skin, pains about the throat, and vomiting. Generally towards the end of the first day's illness, sometimes even at the very outset, a child but a few minutes before in apparent good health, presents itself with a raspberry-red blush or rash, which may either cover the body completely or else appear here and there in patches. The face, the interior of the thighs, the groins, and the neighbourhood of the joints are favoured situations for the rash. At first glance the eruption looks uniform, but a closer examination discloses innumerable round points, some of which are more pointed and higher than their neighbours, and often run into minute bladders about the size of a pin's head.

Sometimes the disease is singularly mild; sometimes exceedingly virulent. Sometimes it is so fugacious that its presence is not suspected until the skin begins to peel, a process notably observed on the hands and feet. Frequently the joints, particularly the wrists, suffer pains analogous to those of rheumatism.

Scarlet fever is an extremely contagious disease, and while after ten days' isolation and the use of a bath at the close, a child convalescent from measles may be allowed to associate with others, not less than six weeks' isolation is required to exhaust the communicability of a case of scarlet fever.

E. *Mumps* may come on suddenly, or else be preceded by a few days of general indisposition, which now and then amounts to high fever. A feeling about the jaws of stiffness is soon followed by swelling, often very bulky, and more or less tense. The swelling is apt to extend either at the back of the lower jaw or underneath it. The swelling contains no fluid: dental pain

is absent. Generally first one side of the jaw is attacked and then the other; it is rare for both sides to suffer simultaneously. Not uncommonly similar swellings burst out in other localities of the body, the genital organs being most liable to seizure.

F. *Ulcerative Stomatitis* is a contagious disease. Its invasion may be preceded by general indisposition, usually unattended with fever. Greyish bleeding ulcers, tending to spread in extent and depth, attack the edge of the gums, the inner side of the cheeks and lips, and the roof of the hard and soft palates, accompanied with an extremely fetid breath.

G. *Diphtheritic Sore-throat or Croup* is eminently contagious. Its approach is insidious, often commencing with some difficulty in swallowing and slight hoarseness. Possibly the glands at the back of the angle of the jaw swell, which in serious cases extends to the neighbouring structures of the neck. At other times these symptoms occur subsequent to a swelling about the nostrils, with more or less copious discharge, indicating that the nasal membranes have been seized prior to those in the throat. Cough, if any, is faint and muffled; the voice is hoarse and smothered.

With a spoon press down the child's tongue, and note if there be any appearance about the tonsils and the soft palate of a skin or leather-like membrane, which may be greyish or whitish, or even blackened by vitiated blood. This false membrane, which characterises the disease, is prone to spread over the neighbouring parts, notably, reaching downwards into the windpipe.

This diphtheritic croup must not be confounded with false or spasmodic croup.

In *false* croup the child has generally been perfectly well during the day preceding the night on which it suddenly wakes up all at once ill with alarming signs of threatening suffocation, attended with loud clamorous coughing and a clear voice. Here no false membrane is present in the throat, nor are the glands about the jaw swollen.

False croup is generally mild, and it is not contagious.

H. *Dysentery* may be contagious. It is distinguished by a frequent, sometimes a continual desire, to seek relief on the closet, where in spite even of severe straining the child succeeds

in passing only a little slime or mucous, often coloured by small quantities of blood. General indisposition and colicky pains in the belly soon compel the child with dysentery to leave the school.

To stop infection, no child suffering with dysentery should be allowed to use the general school water or other closet.

Dysentery is not to be confounded with diarrhœa where there are more or less frequent liquid motions.

I. *Typhoid Fever* is infectious, and is apt to set in or to sneak in with ill-defined signs. For some days the child may have lost its appetite and its general energy, it is fatigued and "knocked up." Then the fever is next ushered in with great pain, noises and confusion in the head; the hearing becomes obtuse; giddiness occurs, with great difficulty to keep any upright position. There is often bleeding from the nose generally followed up by colicky pains in and swelling of the belly associated with some diarrhœa. The skin is dry, parched and hot; the tongue fouled, with red tip and sides. However, the child before this has been compelled by its state of indisposition to cease attending the school.

J. *Hooping Cough* is eminently contagious. The child may be noticed to have had during one or more weeks occasional but violent fits of coughing, which are most frequent during the night. If no complication be present, there is practically no cough between these spasmodic attacks. Usually a short feeling of general indisposition precedes the attack, during which the child in vain struggles to suppress the cough about to burst, when all at once the trunk and frame are subjected to a violent series of successive throbs almost threatening suffocation. At this epoch a few deep drawings-in of the breath are followed by a whistling and almost convulsive inspiration, which may again be succeeded by boisterous coughing. Then in most cases, after a brief moment's repose, a second but a less severe and a shorter onslaught than the first is noticed. Lastly, the fit is terminated by the child's partly spitting and partly swallowing some thick mucus, often at the same time vomiting up any matter present in the stomach.

The time occupied by these seizures to their termination by expectoration varies from sixteen seconds to a couple of minutes.

Owing to the grave and fatal complications often associated even with apparently mild cases of hooping cough, most especially in very young children, immediate isolation of the sufferer from its school-fellows is necessary,

Ophthalmia.

Both catarrhal and purulent ophthalmia are highly contagious at all ages, but especially in very young children, and the last-named disease may cause the loss of one or both eyes.

The eyes and their lids become red, swollen, and bathed with a discharge often more or less offensive.

Contagious Parasitic Diseases.

A. *Itch* is characterised by the appearance of minute transparent vesicles, which occasion the most lively itching, particularly at nighttime. The spaces between the toes and fingers, and the wrists are most liable to invasion. The child's frequent scratching soon converts the rash into scabs, in which condition the disease will frequently first be noticed by the teacher.

The itch is caused by an insect (*Acarus scabei* or *Sarcoptes*) which is nocturnal in its habits and movements.

Though highly contagious, the itch can be cured in a few hours.

B. *Crusted Ringworm*, or *Tinea favosa*, is caused by a vegetable parasite frequenting the scalp, although it may visit other parts of the body which are covered with hair or down. The hair becomes thin and fragile, with loss of its original colour; then follow irregular unequal puckered crust-like yellowish scabs, which may be single or may cover the entire scalp. The scabby flakes in drying and dying crumble to minute fragments, and as dust propagate and disseminate the disease. Itching being frequent in scalp-ringworm the child's scratching increases the destruction and pulverisation of the scab, and thus increases the chances of contagion to others.

The heads of such children as suffer from the disease have a peculiar fetid odour resembling that of a cat's urine.

Till quite cured, every child suffering from *favus* should be

separated from its schoolfellows, and only be re-admitted on presenting a proper medical certificate.

B. *Common Ringworm*, or *Tinea tonsurans*, is very contagious, making itself manifest by the hair of the head becoming thinner, more fragile, less coloured than the surrounding hairs. The affected hairs are apt to turn reddish or ashy-grey: they seem as if evenly and artificially clipped off at a distance of say $\frac{1}{14}$ to $\frac{1}{8}$ of an inch above the level of the outer layer of the skin. The surface of the patches is rough, irregular, shaggy, covered with a greyish, scurfy powder of a slightly bluish tinge. The diseased places may be one or more in number; the form is circular, varying in size from that of a silver florin to a crown piece. By the fusing together of several of such parasitically affected localities the greater portion of the scalp may become affected.

C. *Ringworm with Baldness of Scalp.*—(*Tinea decalvans.*)—This contagious complaint declares itself by the presence of defined patches naked of all traces of hair having a glistening ivory whiteness not unlike a scar without depression. Their size varies from that of a silver threepenny piece upwards.

Previous to the loss of hair there may have been considerable itching. The eyelids and other parts of the body covered with hair or down may also suffer from the vegetable parasite causing the disease (*Microsporon Audouin*). In children and adults with thick hair this disease may remain long undetected.

Each child in schools should have its separate brush and comb. Barbers by using the same brushes and combs in common for all their customers of all ages are thereby apt to distribute these hair and skin diseases.[1]

Diseases Contagious from Sympathy or Imitation.

A. *Fits or Falling Sickness.*—Epilepsy is marked by fits which occur at intervals of various lengths even in the same individual. During the intervals between the fits the health may be perfect.

There is a milder form of epilepsy, an epileptic giddiness or vertigo differing from the true epilepsy with severe convulsive

[1] The subject of *lice* is not referred to in M. Delpech's report.—J. L. H.

fits, as if the two were distinct diseases rather than higher and lower terms in the same morbid progression.

Epileptic giddiness consists in a sudden loss of consciousness, the child remaining in the last position assumed immediately previous to the attack. Thus, if the siezure should arrive during, say, a meal, the raised hand armed with food would during the seizure remain in that particular position. The face is pallid, and sometimes agitated by slight movements. For a space of time ranging from a few seconds to a couple of minutes the child's brain-power seems to remain as if suspended, inert and inactive. Then without any knowledge of that which has just occurred, the arrested action is completed, of say introducing the food into the mouth. At other times this stage of unconsciousness may be succeeded by one of drowsiness or of puzzled astonishment lasting for several minutes.

Again, others afflicted with epileptic giddiness, may during the fit commit unconsciously some act, after which they will return to their normal habits.

Whilst yet, in a further class, the child falls to the ground without convulsion, and in a few minutes afterwards gets up without noticing the fall which has just taken place.

On the other hand, *true epilepsy* occurs suddenly with or without warning. All at once the child becomes pallid, and falls to the ground unconscious, with or without giving a shriek. His body becomes rigid, but agitated with violent convulsive movements affecting the trunk and limbs, and at times resulting in severe self-wounding. The face turns to a ghastly bluish-red colour, the features become distorted and agitated with convulsive movements, and the teeth are brought together with forcible jerking apposition (grinding, gnashing). From the closed mouth there escapes an abundance of saliva, which sometimes dribbles away, sometimes forms a foam about the lips. In these true fits the tongue is liable to be lacerated by the teeth, when, of course, the foam will be bloody.

The duration of the fit may be from thirty to forty seconds, or even for several minutes, and even for a longer period.

As the fit subsides, the rigidity of the body diminishes, the face becomes again pallid; noisy snoring accompanies deep drowsiness, which may continue minutes or hours. The child

then wakes up perfectly ignorant of what has just transpired, but astonished, puzzled, weary, and worn out with over-fatigue, and in pain from various bruises caused by his fall or by his struggles during the seizure.

B. *Hysteria* (*Nervous attacks*) would, as a rule, only attack the elder pupils of the school, for it rarely occurs till a later period of life. It is apt, as epilepsy, to show itself in a convulsive form, but the convulsion differs from epilepsy by the greater extent of the movements. Moreover, the general condition of the person affected differs much; there may be cries and tears, and usually there is no loss of consciousness or it is incomplete.

It is important to separate children suffering from epileptic or hysterical convulsions at once from healthy children. Arch imitators like children are notoriously prone to become influenced, impressed, and injured by witnessing as spectators convulsive attacks which later they are apt to mimic. Their mere sympathetic *fright* may induce corresponding change of the nervous system in young and previously perfectly healthy children.

C. *St. Vitus's Dance* (*Chorea*): *Grimaces.*—For similar reasons a child affected with *Saint Vitus's dance* should not be allowed to attend school till quite cured of its complaints; and children liable to these involuntary hideous grimaces (a form of St. Vitus's dance) which are sometimes acquired in very early childhood, should also be excluded. Previously sound children will pick up facial tricks, and although the adoption of such habits do not interfere with the general bill of health, yet in later life these acquired grimaces may be attended with serious consequences and drawbacks.

THE PRACTITIONER.

MAY, 1880.

Original Communications.

CHEKEN IN WINTER-COUGH.

BY WILLIAM MURRELL, M.D., M.R.C.P.,

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A FEW months ago Messrs. Wyleys & Co., of Coventry, placed at the disposal of the staff of the Royal Hospital for Diseases of the Chest some liquid extract of cheken, and I was asked to give it a trial.

Cheken, or chekan, or chequen—for it is known by all three names—is an evergreen shrub, closely resembling our common myrtle, and it grows abundantly in the central provinces of Chili. It is usually said to belong to the genus Eugenia, but by some it is referred to the closely-allied genus Myrtus. The natural order Myrtaceæ contains many medicinal plants, as for example the clove (*Caryophyllus aromaticus*), cajeput (*Melaleuca minor*), pimento (*Eugenia pimenta*), and the members of the Eucalyptus tribe. A good description of cheken, by Mr. Holmes, will be found in the *Pharmaceutical Journal* for February, 1879.

From a manuscript by Dr. Henry von Dessauer, of Valparaiso, I learn that he has used cheken for some years in the

treatment of a number of widely different complaints. Thus as an inhalation he uses it in diphtheria, laryngitis, bronchitis, and bronchorrhœa, as an injection in certain affections of the mucous membranes, as gonorrhœa, leucorrhœa, cystitis, &c., whilst given internally, in the form of syrup or liquid extract, it is said to aid digestion, allay cough, facilitate expectoration, and stimulate the kidneys to action. It is also an astringent, and is found to be of especial service in threatened hæmoptysis. Dr. von Dessauer used it with marked success in more than a hundred cases of bronchitis and phthisis. For many years he was physician to a large convent school, many of the inmates of which suffered from consumption; hæmoptysis being of constant occurrence. During the two and a half years that he gave cheken in this establishment he had not a single death from phthisis, there were no fresh cases of hæmoptysis, and many of the patients who had had repeated attacks of bleeding from the lungs recovered and gained flesh and strength in a very marked manner. Equally good results were obtained by other physicians in Valparaiso and elsewhere.

The liquid extract of cheken is made according to the directions given in the United States Pharmacopœia for the preparation of fluid extracts, and corresponds in strength to the fluid extract of cinchona, &c.

I have notes of fifteen cases of chronic bronchitis in which I have employed cheken, all the patients, with one exception, being men. The age of the woman was 51; the ages of the men ranged from 36 to 58. They were all bad cases, most of them of many years' duration. Many of them had been attending at the hospital for some considerable time, and almost without exception they had in former years undergone much medical treatment with comparatively little benefit. Their occupations exposed them to cold, and wet, and draught, and in some instances they had the additional disadvantage of working in a dusty atmosphere. They complained chiefly of paroxysmal cough, with thick yellow expectoration and much shortness of breath on exertion. On physical examination of the chest emphysema was detected, with or without a little rhonchus at the bases behind. They were, in fact, ordinary cases of winter-cough. The liquid extract of cheken was ordered in two-drachm

doses in a little water every four hours, the dose being usually increased at the expiration of a week to half an ounce. The medicine was always taken without difficulty. In all cases the patients obtained some benefit, and in most instances the relief was very marked. There was in a few days a decided improvement in the cough, expectoration was from the first easier, and soon diminished in quantity, and finally the dyspnœa was less.

The following may be taken as an average case :—Mark R., aged 40, has suffered from cough, "off and on," almost all his life. It is not so bad in the summer, but in winter he "almost goes in fits with it." This winter he has "had it bad" for about three weeks, and is unable to follow his occupation as a packer. There is a great deal of expectoration—"thick and sticky." Sometimes it is streaked with blood, but only after violent coughing. He is very short of breath when he moves about, but not when he is quiet and is not coughing. The cough is worse than the shortness of breath, for the attacks of cough come on almost every time he moves, and last from five to ten minutes, straining him very much. He has lost his appetite, but does not think he has lost flesh. On physical examination of the chest there was marked emphysema, and a little rhonchus was found at the bases posteriorly. He was ordered two drachms of the cheken every four hours in half an ounce of water. In a week he returned, and said he was a great deal better in every way. The cough was easier, was "almost well yesterday." The phlegm "comes up more readily," but he did not think there was less of it. The shortness of breath was less, but that had not improved so much as the cough. On the whole it had done him "a great deal of good." He was told to continue the medicine for another week, and his report then was that there had not been any further improvement, though he had not gone back at all. His cough troubled him at night, and sometimes gave him no rest. The phlegm was somewhat less, and the breathing was a trifle easier. The medicine was then given every four hours, and on this the improvement was very marked. He did not cough "a quarter so much," and it no longer disturbed him at night. The phlegm too was "considerably less," though the shortness of breath was not much

easier. He was sure the medicine did him more good when he took it every four hours, and was confident that it had benefited him greatly. He asked for a fortnight's medicine, and did not return.

Even in cases of phthisis some benefit was experienced. For example, a clerk, aged 40, with a cavity on the right side, and consolidation at the left apex, was ordered two drachms of the liquid extract every four hours. In three or four days he noticed an improvement in the cough, the expectoration was less tenacious, and came up more readily; his breathing was easier, the night-sweating, from which he had suffered slightly for a fortnight, ceased, and he slept better. At the expiration of a fortnight he said he was better in every way. He continued taking the medicine for three months, and then, the more distressing symptoms having been relieved, ceased to attend. In three other cases of phthisis the cheken eased the cough and lessened expectoration, the patients expressing themselves as feeling better. In two cases no benefit was experienced. The amount of material at my disposal was limited and I had no opportunity of following up the subject.

That cheken can be given in large doses without the production of any disagreeable symptoms is shown by the following case:—A clerk, aged 36, came to the hospital complaining of a distressing paroxysmal cough, from which he had suffered for about two months. There was very little expectoration, but what little there was was thick and yellow, and came up without difficulty. There was no loss of flesh, or night-sweating. The chest was somewhat emphysematous, but no rhonchus could be detected. He was ordered two drachms of the extract of cheken four times a day, and a week later he reported that the cough was much better and the expectoration nearly gone. He continued taking the medicine for a fortnight longer, and then seems to have caught a fresh cold, for the cough, which had almost ceased, returned with increased violence, accompanied by a great deal of expectoration. He was then ordered an ounce of the extract of cheken in water three times a day, and this he took for a fortnight, not only without difficulty, but with marked benefit to the cough. He was then given experimentally an ounce and a half of the liquid extract in a little

water three times a day, and this he took for a week without the slightest inconvenience, and without any unpleasant effect, except that it confined his bowels.

I have had no opportunity of testing cheken in any of the other diseases for which it has been recommended, but entertain no doubt that it will prove a valuable addition to our remedies for winter-cough.

NEW ZEALAND AS A RESORT FOR CONSUMPTIVES AND OTHER INVALIDS.

BY W. H. MABERLY, M.D., M.R.C.S.

Medical men have long been in the habit of recommending consumptive patients to seek restoration to health by residence in the south of France, Italy, Madeira, and elsewhere, but comparatively few are sent to the Australian colonies for that purpose. This is no doubt due in great measure to the distance of our colonies from England, yet every year the facilities for travelling are becoming so greatly increased that it is now a comparatively easy matter for those who are not confirmed invalids to make the voyage out and back, or to take up their residence in the colony for a time.

If the advantages to be derived from the colonial climate were better known amongst medical men, I have no doubt they would more frequently recommend it to their patients in preference to any of the health-resorts nearer home.

Having myself visited these countries, I took the opportunity of collecting information relative to their climate and health, and studied especially the statistics published by the several colonial governments.

From this investigation I am satisfied that the Australian colonies do possess advantages for consumptives and other classes of invalids superior to those of any of the health resorts nearer home, but that New Zealand far surpasses any of them in this respect; and this fact I wish particularly to bring out in the following paper.

We will first consider the subject of the climate of New Zealand, and then proceed to discuss the question of its health, pointing out the diseases for which it is specially suitable.

I. Its Climate.

New Zealand consists chiefly of two large islands, extending from north to south about 900 miles, lying between latitudes 34·30 and 47·15 in the south temperate zone, but the largest northern town is situated 17° nearer to the equator than is any part of Great Britain.

We should therefore naturally expect to find its climate much warmer than that of England, but its greater length necessarily implies considerable difference in temperature between its northern and southern parts.

The South (sometimes called the Middle) Island is the larger of the two, and as a whole is more developed and opened up than is the North Island, where progress is considerably impeded by the native race of Maoris, who still lay claim to a large and rich portion of land in its interior, and from which the white man is rigidly excluded.

Wellington, the capital town, is situated in the southern part of the North Island, and contains a population of about 12,000, but Dunedin, at the south of the South Island, is the largest town in the colony, and contains over 20,000 inhabitants.

The large towns being all situated on or near the sea-coast, communication is made by means of steamers, which ply at regular intervals between the chief ports, whilst railroads in many places, especially in the South Island, bind together the larger with the smaller towns around them.

The towns themselves are usually built after the American model, the houses being mostly of wood, with verandahs around, or at least in front of them, though latterly many of the principal buildings are constructed of brick and stone, and are as handsome as many in our English towns.

When once in the colonies the traveller will find hotel accommodation both good and cheap, and he will soon be able to make himself at home amongst a people who abound in hospitality towards their brethren from the old country. Albeit society does not preserve such distinctions as in England, and there is a tendency to the levelling of classes, which new comers find to be somewhat grating to their feelings, and luxuries are few compared with those we enjoy.

The large towns have all of them railways in connection with

surrounding districts, but travellers have often to take long journeys by coach through wild and uncultivated country, thus giving opportunity for admiring grand and striking scenery, often repaying all the annoyances and fatigues of coach travelling.

Hotel expenses are, as a rule, less than in England, ten shillings a day being the usual tariff for board and lodging, and both food and accommodation are very good, yet masters and servants often dine at the same table.

The seasons in New Zealand are exactly the reverse of ours at home, summer there corresponding with our winter here. Yet they are very much less marked by changes in temperature than with us, and frost and snow are very rarely met with in any town on the sea-coast. Nor are there any distinct dry or wet seasons as in tropical countries. The three hottest months in New Zealand are December, January, and February; though the mean temperature for March sometimes exceeds that for December, but January is always the height of the summer. During the greater part of the year, however, the climate of New Zealand is simply delightful. The temperature is warm, without being insufferably hot at any time, and the sky is of a bright cerulean blue like that of Italy, with little interval of cloud or fog, and none of that prolonged dull weather so depressing to one's feelings in this country.

But in spite of this, the warmest days are not quite as hot as those we sometimes have in England, for in the colony, the hottest temperature in the shade was only 89° in the two years 1873 and 1876 (these two years having nothing special beyond the fact that the statistics for them were close at hand), and this was only reached once in each year, whilst the temperature of 94° was attained at Greenwich in July 1876. Added to this, the heat of New Zealand is a dry one, and so more bearable than is our damp oppressive climate.

This fine bright weather often lasts many weeks, and sometimes months together, without any prolonged break of rain or cloud, yet as a rule there is never a month without rain in New Zealand, though it rarely falls in that undecided drizzle which we so frequently have in this country. Though the summer temperature is not hotter, still the heat continues longer throughout the day, and extends over a greater number of months than in England.

The best proof of this is to be found by comparing the statistical tables of the two countries, which show us that in 1876 the summer temperature there exceeded 75° for six months in the year, whilst in England it only exceeded that temperature for three months in the year, also the mean monthly temperature in New Zealand exceeded 55° for seven months, whilst in England it only exceeded 55° for four months.

But the mean of the hottest month, January, ranges between 62° and 67°, in the North Island, according to locality, and between 60° and 66° in the South Island, corresponding almost exactly with the mean at Greenwich, which in the same year, 1876, was 65°.

The winter in the colony resembles our late spring or early autumn, with certainly a larger proportion of sunshine, and less cloud, and very little fog compared with what we have in England.

The mildness of the winter may be clearly apprehended from the fact that in the North Island during 1873-76, the thermometer never fell to freezing point in the two largest towns in the South Island, and the lowest temperature attained was only 28°, and that in one place of observation.

One does occasionally see ice, however, in the North Island, but it is never thicker than a coin, and soon melts away before the warm rays of even the winter sun.

In the South Island, during the same years, the lowest temperature in any town was 23°·3, which was only reached on one occasion.

Snow also very seldom falls at any town in the North Island, and here at Wellington, where it was most frequent, it was only noted on nine days during the same number of years from 1868 to 1876. It is seen more frequently in the South Island, but never lies long on the ground.

The important point regarding the climate of New Zealand as to its suitability for invalids is its great equability, for we find that the difference between the mean temperature of its hottest and coldest months is exceedingly small. This has been demonstrated by Dr. Hann of Vienna, in an essay on the climate of New Zealand, published in the meteorological report of the colony for 1873, where he introduces a table of the variations of temperature from observations extending over ten years taken at eleven meteorological stations.

This table points out that the mean range between January and July varied only between 14°·4 in the town of least range to 16°·11 in the town of greatest range in the North Island, and between 13°·86 and 17°·55 in the South Island. Dr. Hann says, "The mean difference of temperature between the warmest and coldest months is everywhere very small, and is nearly everywhere smaller than the daily fluctuation of temperature." If we contrast with this the Registrar-General's report we find that the difference between the summer and winter temperature in England in the year 1876 was 28°·8, that is to say, nearly twice as large as the average range in the North Island for the ten years above quoted.

The statistics also inform us that the summer temperature of Wellington in the North Island, and of Christchurch in the South, is just that of the summer in London, whilst the northern towns are all very much warmer; that the spring months in London are even colder than any of the winter months in the North Island, and about equal to the winter months in the South Island.

Of the two islands the Northern is necessarily the warmer, and the range of temperature in the North Island is considerably smaller than that in the South; *i.e.* its climate is more equable.

Auckland has the most equable climate of all the towns, its mean summer and winter range being only 13°·5, whilst Christchurch has the most variable, its range being 18°·4; as compared with these, London has a mean variation of 22°.

With regard to the equability of the New Zealand temperature Dr. Hann further says, "The range of the average monthly temperature is in New Zealand very small, and again corresponding with the small difference between the warmest and coldest months." The greatest mean fluctuation in any month during thirteen years was only 1°·98, which Dr. Hann shows to be considerably less than that of Palermo in Sicily, which is situated in almost a corresponding latitude with Auckland, and is known to have a remarkably equable climate.

The reader must not suppose from the foregoing description of the New Zealand climate that sunshine and little else reigns all the year round, for there are many changes in the climate, and rain seldom descends in drizzling showers, but in torrents,

which, however, are soon over, and are usually followed by a bright and cloudless sky. Rain, indeed, falls very heavily, at times in almost a tropical downpour, so that the rainfall is much larger than in England, but in spite of this there are fewer days on which it falls at all, so that there are a greater number of fine days. In 1876 London had forty-five more wet days, or about one in every eight more, yet the rainfall was only 24·1 inches, just that of the dryest place in New Zealand, viz., Christchurch, whilst 116 inches fell in the wettest place.

To invalids this is a matter of great importance, as enabling them to take more out of door exercise than in our damp and uncertain climate. The dryness and clearness of the atmosphere have also a very exhilarating effect on one's spirits as compared with dull depressing weather, of which we have so much in England. In some parts of the country strong winds prevail, and in the summer dry and hot winds are frequent, in the South Island chiefly, but they are never severe enough to be oppressive as are the hot winds of Australia, which often glow like a furnace and bring clouds of dust and sand along with them.

By referring to Sir James Clark's table of the temperatures of health-resorts in different parts of the world, which is inserted here, we shall find that the climate of Auckland in the north of New Zealand is more equable in the temperature of its seasons than any place in Europe or in Australia; Madeira only, of sixteen places quoted, has a more equable temperature.

The winter of Auckland also is warmer than that of Mentone, the former averaging 50·68°, and the latter 49·5°, whilst the summer is not so hot by 7°. The summer of Auckland has also a mean temperature 6° higher than London, and a winter 12° warmer. The climate of Auckland is specially beneficial to asthmatic patients on account of the dryness and equability of its temperature, and the health of this part of New Zealand has been so satisfactory when tested by its effect upon the military who have been from time to time quartered there, that it has been suggested that British troops when withdrawn from tropical climates should be stationed for some time in the province of Auckland in order to recruit their health, instead of being removed at once to England.

Compared with the climate of any of the Australian colonies that of New Zealand is not so hot and dry. It is not unusual

for rain to be absent many months at a time in many parts o Australia, droughts of nine months, twelve months, and even eighteen, having been recorded; yet a month never elapses in New Zealand without rain falling.

The extreme annual range of temperature in these places will give a fair comparison between the chief towns in the colonies. I give a list of them here:—

Auckland.	Annual Range (Extreme),			48°·5
Wellington.	„	„	„	46°·6
Nelson	„	„	„	56°·0
Sydney	„	„	„	65°·0
Melbourne	„	„	„	82°·0
Hobart Town (Tasmania)			„	76°·6

No town in New Zealand has a larger range than 59°, viz., in Christchurch; so that the variation of temperature in all of them is much smaller than in any of the Australian towns.

The climate of Tasmania very closely resembles that of the southern part of New Zealand, but it is frequently much hotter in the summer. For example, the thermometer in 1876 indicated over 100° on several occasions, though it never exceeded 88° in any of the New Zealand towns in that year. Tasmania is also much damper, and more subject to fogs and mists than is New Zealand, and is also colder in the winter.

These facts all assist in proving the climate of New Zealand to be more equable than that of any other Australian colony; and in the choice of a climate for sufferers from pulmonary diseases, equability is of the first consideration, for these, in common with such diseases as rheumatism and gout, are greatly influenced by changes in temperature.

II. Its Health.

We will now consider the subject of the health of New Zealand, and compare it with that of England and of the Australian colonies; and in doing so we must take into account some of the features peculiar to the colony, such as its insular character and great distance from any other country (1,400 miles at least from Australia), and to the sparseness of its population and the prosperity of its inhabitants. We must also remember

that it was only founded in 1840, and that in a country as large as Great Britain there are only as many inhabitants as in Birmingham, and that there is no pauper class in the country. With such favourable circumstances we shall naturally expect the health of its inhabitants to be far above that of England or of any European community. Indeed, the health of all the Australian colonies surpasses that of any European country, and in a statistical table of eleven such countries, Denmark is the most healthy, with an annual mortality of 20·040 per 1,000, and Austria the least so, with a death-rate of 32·085 per 1,000; whilst all the Australian colonies have a much smaller mortality than any of these, New Zealand standing at the head of them in this respect.

The table annexed will best illustrate this, and will also show us that, compared with England, its mortality is little more than half, or as the numbers 6 to 11.

TABLE I.—DEATH-RATES IN EUROPEAN COUNTRIES AND IN AUSTRALIAN COLONIES.

County	Years over which average extends.		Annual deaths per 1,000 population.
	Number.	Period.	
1. England and Wales . . .	20	1854 to 1873	22·260
2. Scotland.	5	1869 to 1873	22·400
3. Ireland	11	1865 to 1875	17·100*
4. Denmark	20	1854 to 1873	20·040
5. Sweden	20	do. do.	20·115
6. Austria	20	do. do.	32·085
7. Prussia	20	do. do.	27·150
8. Netherlands	20	do. do.	25·715
9. France	20	do. do.	24·480
10. Spain	10	1861 to 1870	29·740
11. Italy.	11	1863 to 1873	30·170
AUSTRALIAN COLONIES—			
1. New Zealand	11	1865 to 1875	12·70
2. Tasmania	11	do. do.	14·69
3. South Australia	11	do. do.	15·26
4. New South Wales. . . .	11	do. do.	15·41
5. Victoria	11	do. do.	15·92
6. Western Australia . . .	4	1872 to 1875	16·69
7 Queensland.	11	1865 to 1875	18·21

* Admitted defective.

If we were asked the question, What special diseases are benefited by the climate of New Zealand? we should reply, All those diseases which are alleviated by an equable temperature, such as Phthisis, Bronchitis, Pneumonia, Asthma, Rheumatism, and Gout; whilst persons with a delicate constitution, or sufferers from any hereditary or strumous disease would find the bracing climate of New Zealand one of the best means of restoring their health or of prolonging their life.

In proof of this I must again quote the vital statistics of the colony, which tell us that the mortality from all the diseases above named is much smaller than that which occurs in England.

TABLE II.—MORTALITY FROM DIFFERENT CAUSES IN NEW ZEALAND AND ENGLAND COMPARED.

Diseases.	Deaths per 10,000 Population in each Country.	
	New Zealand.	England.
1. Phthisis	8·406	22·187
2. Bronchitis	6·35	22·89
3. Lung diseases and complications .	1·69	2·77
4. Pneumonia	3·99	10·30
5. Rheumatism	·46	1·63
6. Asthma	·33	1·33
7. Whooping-cough	2·92	5·29
8. Heart diseases	5·27	12·29
9. Scrofula	·63	1·226
10. Tabes mesenterica	1·33	3·15
11. Hydrocephalus	2·103	3·15
12. Liver diseases	1·09	2·81
13. Convulsions	5·20	11·19
14. Paralysis	1·56	5·26

The table shows that in New Zealand there are not more than two-fifths the number of deaths from phthisis, less than one-third from bronchitis, less than one-fourth from asthma and about two-fifths from pneumonia, compared with those in England; whilst heart diseases produce less than half the deaths, and rheumatism less than one-third the number.

Therefore to sufferers from any of these diseases who are well enough to make the voyage, we can confidently recommend a trial of the New Zealand climate, feeling sure they will stand a

better chance of recovery by life in that colony than at home; whilst to consumptives especially, or to those of feeble constitution in whom consumption is at all likely to develop itself, the colony offers, I believe, a better chance of re-establishing their health than any other country in the world.

One can speak thus confidently of New Zealand as a residence for consumptives because statistics show that the mortality from this cause is less than in any other Australian colony, proving that its climate is pre-eminently adapted for invalids of this class, and therefore to it should phthisical patients be sent.

I have looked into this matter from a statistical point of view, and annex the accompanying table showing how great is the advantage of the colony over England in this respect.

TABLE III.—MORTALITY FROM PHTHISIS IN ENGLAND AND NEW ZEALAND COMPARED.

Years.	Deaths per 10,000 of Persons Living.	
	England.	New Zealand.
1872	22·97	9·84
1873	22·14	6·92
1874	21·04	7·91
1875	22·24	9·04
1876	21·45	7·694
Mean of 5 years, 1872-76	21·96	8·28

IN AUSTRALIAN COLONIES.

Country.	Per 10,000 persons living. In 1876.	
1. New Zealand . . .	7·69	Mean of 5 years. 8·28
2. Tasmania	9·42	10 yrs. 1867 to 1876. 8·926
3. New South Wales .	9·91	
4. South Australia . .	10·04	11 yrs. 1866 to 1876. 12·13
5. Victoria	12·16	

TABLE IV.—MORTALITY FROM PHTHISIS IN NEW ZEALAND AND AUSTRALIAN TOWNS COMPARED WITH LONDON.

Country.	Mean Temp.	Deaths per 10,000 of Persons Living.	
		1876.	1877.
NEW ZEALAND—			
1. Auckland	60·0	16·45	7·11
2. Wellington	56·1	13·20	11·53
3. Nelson	55·5	12·56	16·06
4. Christchurch . . .	53·2	13·74	11·39
5. Hokitika	54·0	3·35	10·95
6. Dunedin	51·5	15·06	16·77
AUSTRALIA—			
1. Sydney	63·0	18·08	
2. Melbourne	57·0	22·46	
3. Hobart Town . . .	55·41	Not made up.	
LONDON	50·1	30·42	
London (mean of four years, 1873 to 1876) .	—	21·62	

That New Zealand possesses such an advantage has not been, I believe, hitherto known amongst medical men in this country, who, if they recommend phthisical patients to proceed to the Australian colonies, send them to Sydney and Melbourne in preference to New Zealand or Tasmania. In fact, Victoria, with its capital, Melbourne, is the worst place in all the southern hemisphere as a residence for consumptives, and in support of this I would quote from an *Analysis of Statistics of Consumption in Victoria,* written in 1870 by Dr. Thomson, of Melbourne, who says—

"It appears that of the total mortality in England about 1 in 3 of the adult population die of phthisis. The statement is made by Dr. Guy, Professor of Public Hygiene in King's College, London. As he does not specify what is an adult, the age not being defined, any precise comparison is impossible. But taking the adult age at from twenty to twenty-five years, it is found that in Melbourne of all the deaths between those ages about 1 in 3 die from phthisis. The exact number is 1 in 3·18. For the whole colony of Victoria the exact number is 1 in 3·7,

or more than 1 in 4. Neither Melbourne nor the colony seem therefore to have any vast advantage over England in this comparison. Practically, if judged by this test, they are about equal as to salubrity; climatic influence must therefore be set aside, and an explanation of the facts be sought for in other causes."

Dr. Thomson further shows that in Melbourne and suburbs the deaths from phthisis were 2·544 per cent. in 1865, and 2·129 per cent. in 1869, against 2·266 per cent. in England and Wales in 1855, and 2·361 per cent. in 1866; and that in Melbourne and suburbs the general death-rate had in five years decreased from 1 in 39 to 1 in 47, and the phthisis rate had increased from 1 in 451 to 1 in 396, whilst in England and Wales during ten years the general death-rate had increased from 1 in 44 to 1 in 42·4, yet the phthisis death-rate had decreased in the same time from 1 in 359 to 1 in 381. These numbers tell us plainly that the climate of Melbourne is very unsuitable to sufferers from consumption. The general mortality of that place was also, in 1879, 28 per 1,000, while in Glasgow it was but 18, and in Edinburgh 15 only.

Dr. Thomson is, however, quite unable to assign any sufficient cause for this extraordinary and unexpected mortality; but whatever the effect of the Victorian climate as evidenced by these statistics, it is certain that whilst it is the most variable and the most unfavourable to phthisis of all the Australian colonies, that of New Zealand is the most equable and the most favourable to that disease.

In comparing the numbers in this table of deaths from phthisis, we must remember that they are swelled by the death of those who have resorted to the colonies in hope of benefiting their health, but who were too late to reap advantage therefrom, and have ultimately succumbed to their terrible foe; whilst the numbers for England are diminished, because phthisical patients are constantly leaving our shores to die elsewhere.

A more truthful comparison would be one of deaths of persons born in the colonies, or amongst those who had acquired the disease since their residence there, which would considerably lower the proportion in favour of New Zealand; whilst if this could be done for England it would raise it. Statistics of this kind are, however, unobtainable; yet the native-born colonists are not free from phthisis, and, indeed, it is well known to occur

amongst the Aborigines or Maoris—so that climate alone is not a preventive of consumption. Yet a mild and equable climate with a pure, dry atmosphere, will conduce to the restoration of those suffering from phthisis, and will remove many of the exciting causes which would be likely to set it up in those who have a tendency to it, but will not alone effect a cure or prevent the appearance of the disease.

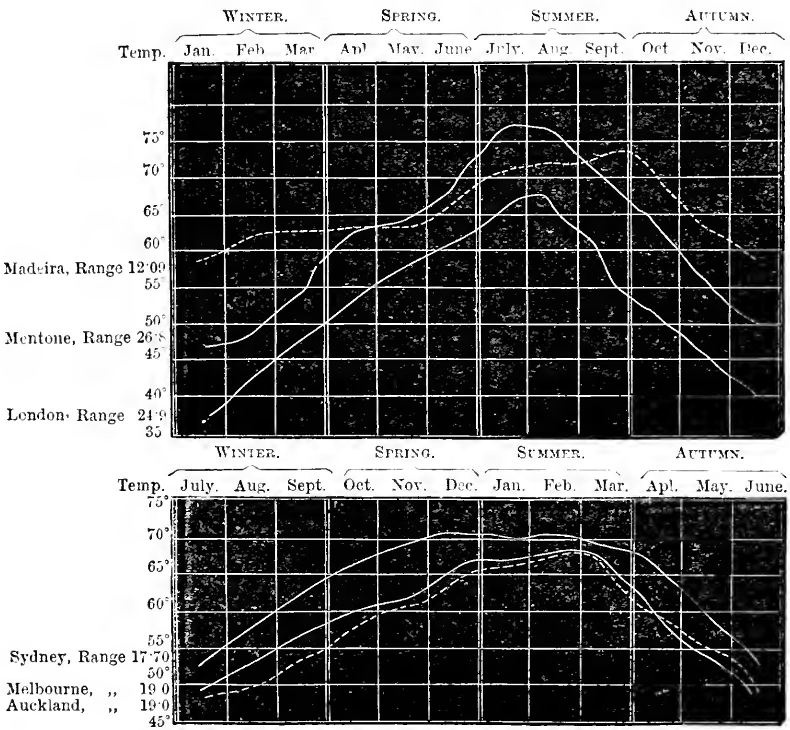
But the special characteristic about a climate, in order that it should be favourable to phthisis, is its *equability*, a point which has been much overlooked in writings on the subject. For in every climate the chances of catching cold, which is the principal exciting cause of inflammation in the lungs, are reduced in proportion to the smallness in the fluctuations of its temperature and to the absence of weather which is damp and cold at the same time, and such indeed is the climate of New Zealand.

It is universally known that diseases of the respiratory organs are always more prevalent in the winter time in England than in any other season, and on this point Dr. Henry Bennet says in his work, *Winter on the Shores of the Mediterranean*, "I have long remarked in England that colds in the head, sore throats, attacks of bronchitis and influenza, only become prevalent when the weather is both cold and wet. Cold dry weather alone does not produce them epidemically, nor does mild damp weather. However wet and damp it may be in England, or in the rain and mists of the west coast of Scotland, as long as a summer temperature lasts and the thermometer is at or above 60°, very few colds are met with. Let it, however, fall to 40°, 45°, or even 50°, and then damp or wet weather is immediately followed by the development of catarrhal disease on a large scale. Indeed, rainy weather, when the thermometer is not below 55° or above 65° night or day, is not injurious to health. The cool rainy summers which we sometimes have in England, and which characterise the west coast of Scotland, are healthier than warm fine summers."

This fact received practical demonstration in the summer of 1879, which, it will be remembered, was remarkably wet, yet the mortality was all along exceedingly low. For example, during six weeks in July and August it was 17·7 per 1,000 against 24·4 and 20·8 and 25·5 in the corresponding periods of the three years 1876 to 1878.

Now the statistics of monthly temperatures in New Zealand show that in the North Island the temperature was never so low as 45°, and there was never a month without rain; so that in New Zealand the climate fulfils the conditions Dr. H. Bennet alludes to.

MEAN MONTHLY TEMPERATURES AT LONDON, MENTONE, MADEIRA, AND IN AUSTRALIA AND NEW ZEALAND.



The density of the atmosphere has also a favourable influence on pulmonary and other diseases; and on this subject Dr. Richardson says, in his *Diseases of Modern Life*:—"During the period when the following diseases, viz., acute and chronic rheumatism, gout, consumption, asthma, carbuncle, remittent fever, dysentery, diphtheria, and markedly scarlet fever are most prevalent, the conditions of atmosphere then prevailing are characteristic of low barometrical pressure, with extreme humidity of the air and with a temperature of from 45° to 50° F.

Now the barometrical pressure in New Zealand is considerably

Z 2

higher than that of London. In the North Island for 1876 it was 29·950, and in the South Island 29·874, against 29·719 at Greenwich, which is quite an important difference; so that in this respect the climate has an advantage over that of England.

It is not, however, for these diseases only that New Zealand is specially healthy, for the statistics show that the mortality from many other causes is far lower in the colony than in England.

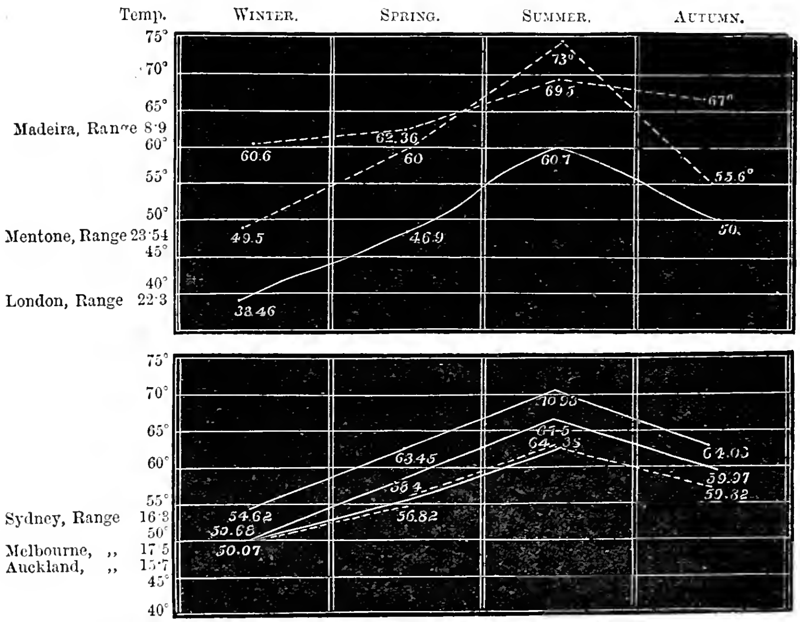
Thus a much smaller number die from all febrile diseases, excepting typhoid fever, which is considerably more frequent and more fatal. Also liver diseases, dropsy, scrofula, convulsions, cancer, pericarditis and insanity, with hydrocephalus and epilepsy, all cause fewer deaths in New Zealand than in England, many of which are quoted in the table No. II. These are specially diseases of a strumous or hereditary origin, showing that the climate is specially healthy to young people, which receives additional support, when we find that the infantile mortality is exceedingly low, the proportion being in New Zealand 10·23 per cent. of the total births, against 14·95 in England; New Zealand having the lowest mortality in this respect of all the Australian colonies. Yet, on the other hand, deaths from diarrhœa, dysentery, diphtheria, and croup bear rather a larger proportion to the total mortality than they do in England. Of these typhoid fever and diphtheria are very much under the control of sanitary measures, which are unfortunately in a very unsatisfactory state in most of the towns. But considering the youth of the colony, which is barely forty years old, a high state of sanitation cannot be expected; yet as its prosperity increases improvements will and are now being made in this respect.

But I have shown in the table that New Zealand is specially favoured as regards mortality from rheumatism and gout, and to a large class of sufferers from these and kindred diseases, which assume a chronic form and become so intractable to treatment at home, we would confidently recommend a trial of life in the colony.

Here, in addition to a mild and equable climate, the patient can obtain very much the same kind of treatment by visiting the hot springs in the Auckland Province as he could at the Spas of England or Germany, only in an exceedingly rough-and-ready style. These hot springs are, however, becoming more

frequented every year by invalids from all parts of the colonies, on account of the cures that have been effected by their use. At present access to them is somewhat difficult, as they are situated in the Maori territory, and distant forty miles by coach from a sea-port, at which steamers from the north and south call twice a week. The baths here mostly consist of holes scooped out in the earth—into which the hot water is allowed to run from an adjacent spring, in order to cool down its temperature to about 100° F.

Mean Temperature of Seasons in London, Mentone, and Madeira, and in Sydney, Melbourne, and Auckland.



In some of these baths the natives disport themselves hour after hour—men, women, and children luxuriating in the hot water in truly pristine simplicity. Notwithstanding the rough style in which the baths must be taken, many persons who have tried other methods of cure receive great benefit from the treatment; and the efficacy of the springs is becoming more recognised amongst colonists every year.

One frequently hears of cases of advanced phthisis or other pulmonary disease being hurried off on a long voyage all alone,

as though the sea air of itself were sufficient to restore them rapidly. The result being, that the absence of attention, with suitable diet and luxuries, which no one can expect to get on board ship, speedily aggravates their symptoms; they die on the way out, or shortly after reaching their destination, unknown and uncared for in a strange land. Great caution ought, therefore, to be exercised in sending out patients with phthisis, and only those who are quite strong enough to bear the fatigue should venture on a voyage.

At present there is no line of steamers going direct to New Zealand, but any of the ports can be reached in four or five days from Melbourne or Sydney, to which steamers are constantly running.

Invalids, especially those with lung diseases, should be recommended to travel first-class, and by the best steamers if possible. Those of the Orient line have been making the distance in the short space of thirty-nine and forty-two days, and one latterly did so in thirty-five days; whilst a sailing vessel will average eighty or ninety days in the passage. By steamer the passenger will get rapidly over the changes of climate necessarily passed through, which are often very sudden and trying to sufferers from lung diseases, whilst the comforts of first-class fare, and other conveniences, on a palatial steamer assist to keep up his health during the voyage.

In conclusion, I venture to hope that the facts I have mentioned should be sufficient to turn the attention of medical men towards New Zealand as a resort for such of their patients who need change of climate when suffering from any of the diseases which I have mentioned, especially those with phthisis, bronchitis, or asthma and rheumatism, as well as to those of a weakly constitution.

The statistics I have quoted show clearly that New Zealand is healthier and more equable than Australia or any European country, from which one may safely draw the inference that New Zealand is at present the *healthiest country in the world.* We should like this fact to be widely known amongst medical men, hoping that they may see fit to recommend their consumptive patients to seek restoration to health on its genial shores.

TABLE V.

TEMPERATURES OF FOREIGN CLIMATES. SIR J. CLARK.

Places.	Latitude.	Mean annual temp	Mean Temperature of Seasons. Winter.	Spring	Summer.	Autumn.	Difference between winter and summer.	Mean Temperature of Months. January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Difference of hottest and coldest months.
EUROPEAN—																				
1. London (Greenwich, 1814-63)	51·31	49·03	38·46	46·9	60·7	50·0	22·3	36·9	38·7	41·7	46·2	52·9	59·1	61·8	61·2	56·6	50·2	43·2	39·8	24·9
2 Paris	48·50	51·50	38·43	50·40	64·47	52·30	26·0	35·60	40·50	43·50	49·60	58·1	62·5	65·7	65·2	60·4	52·4	44·20	39·2	30·1
3. Pau	43·19	56·18	41·86	54·06	70·72	57·39	28·9	41·2	43·6	48·8	51·8	61·6	68·2	70·6	73·4	67·4	58·2	46·6	42·8	32·2
4 Montpelier	44·15	57·60	44·20	53·33	71·30	61·30	27·1	42·0	45·0	47·0	53·0	60·0	67·0	72·0	75·0	71·0	61·0	52·0	46·0	33·0
5 Nice	43·43	59·48	47·82	56·23	72·26	61·23	24·4	45·85	49·0	51·45	57·0	63·0	69·0	73·59	74·3	69·3	61·8	53·7	48·6	38·45
6. Mentone (Dr. Bennet's)	43·45	60·80	49·5	60·	73·	55·6	23·5	48·2	48·5	52·	57·2	63·0	70·	75·	75·	69·	64·	54·	49·	26·8
7. Florence	43·46	59·0	44·30	56·00	74·00	60·70	29·7	41·0	45·0	48·0	56·0	64·10	69·0	77·0	76·0	70·0	59·0	53·0	47·0	36·
8. Rome	41·52	60·70	48·90	57·65	72·16	63·96	23·24	47·65	49·45	52·0	56·4	64·5	69·1	73·3	74·0	69·5	63·6	58·8	49·6	26·35
9. Naples	40·52	61·40	48·50	58.50	70·83	64·50	22·3	46·5	48·5	52·0	57·0	66·5	71·0	75·0	76·5	72·5	65·0	54·5	50·5	30·0
10. Palermo	38·6	64·4	53·1	59·3	74·7	66·8	21·6													
11 Malta	35·55	67·30	57·46	62·76	78·2	71·03	20·8	56·5	56·3	58·1	61·8	67·4	73·8	79·6	81·2	77·8	71·1	64·2	59·6	24·7
12. Algiers	36·5	64·0	55·	66·	77·	60·	22·													
13. Cairo	30·30	72·17	58·52	73·58	85·1	71·48	26·6	58·1	56·1	64·5	77·9	78·2	83·6	85·8	85·8	79·16	72·3	62·9	61·3	29·7
14. Madeira	32·10	64·96	60·6	62·36	69·56	67·30	8·9	59·71	60·28	61·8	62·0	63·4	66·9	70·0	71·8	71·28	66·76	63·9	61·4	12·69
COLONIAL—																				
15. Auckland	37·0	58·43	50·68	56·82	66·38	59·82	15·7	67·9	67·3	64·2	60·4	54·7	51·4	48·9	51·6	53·9	56·4	60·0	63·9	19·0
16. Port Jackson, Sydney	33·55	62·89	54·62	63·45	70·93	64·03	16·3	61·67	71·61	69·64	64·0	59·6	54·9	53·8	55·3	59·3	63·5	67·7	69·2	17·72
17. Port Philip, Melbourne	37·45	58·98	50·07	58·4	67·5	59·97	17·5	67·6	68·9	65·7	58·6	55·5	50·9	49·9	50·0	54·5	58·1	62·5	65·9	19·0

A PRE-DIASTOLIC MURMUR.

BY AUGUSTUS WALLER, M.B.

A. B. AGED 20. Breathlessness of six months' standing. No previous fever. Moderate cardiac hypertrophy, systolic and diastolic jogs, and faint second impulse thrill. At apex a short rough murmur running up to second sound, and whose commencement coincides with radial pulse, which is not "collapsing." Sounds elsewhere normal. Murmur constant during four weeks' observation.

A murmur having this rhythm is only the second of the kind that has fallen under my notice; it was variously auscultated to be pre-systolic, systolic, diastolic, and exocardiac. In the first case where I recognised it, it had been set down as pre-systolic. It closely resembles the latter well-known murmur, being a short rough run to an abrupt termination in the second sound.

Fig. I. is a normal apex cardiogram, in which letters S and D respectively indicate commencing systole and diastole.

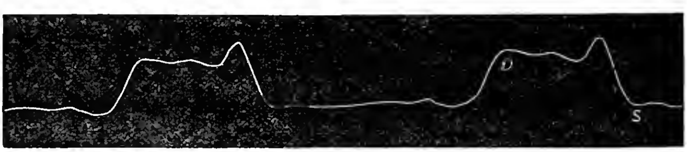


FIG. 1.

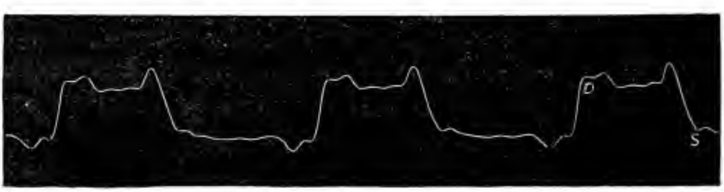


FIG. 2.

Fig. II. is the apex cardiogram of A. B., showing a pre-diastolic disturbance of movement.

Fig. III. is a pre-systolic apex cardiogram of a case where the murmur occupied the whole of the long pause (*i.e.* post-diastolic and pre-systolic).

The tracings read from right to left.

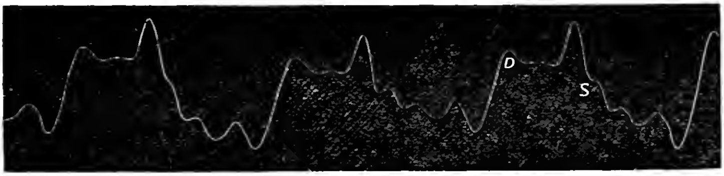
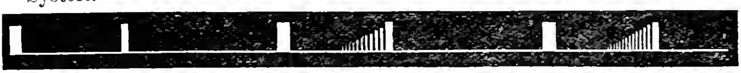


Fig. 3.

In the above three tracings the only features judged to be legitimate premises of opinion are: in Fig. I. a point coincident with commencing systole and with the first sound—a point coincident with commencing diastole and with the second sound; in Fig. II. a disturbance of movement just before the point of commencing diastole; in Fig. III., a disturbance of movement occupying the diastolic period. The explanatory diagram of the vibrations which are manifested in murmur and thrill are for Fig. II.

1st s. 2nd s. 1st s. 2nd s. 1st s. 2nd s.
Systole. Diastole.



The following diagram is for Fig. III.

I have considered the case of A. B. of interest as being an example of a clinical rarity supported by graphic evidence. The murmur not being classical, required some such evidence to redeem its auscultation from distrust. Its significance is not clear; noting that it occupied the terminating systole, it may be regarded as the last bit of an ordinary systolic, but on what such an unusual emphasis of systole should depend can only be imagined.

Haydn (*Dis. of Heart*, &c., p. 885) refers to one case in which a pre-diastolic murmur was present, remarking "and my first impression was that the murmur was pre-systolic." The chief points in the case were—faint systolic and loud pre-diastolic at base, diffused to apex: P. M. aortic atheroma and dilatation, perforation of aortic valves. I find in my note-book the following case, which may be compared with Haydn's: Labourer aged 60—loud basic systolic separated by brief interval from first sound, viz. post-systolic, followed without interval by accentuated second; atheromatous vessels, stabbing pain. *Diagnosis*—Aortic atheroma and dilatation, murmur possibly due to some asperity above orifice?

I am indebted to Dr. Gowers for the case whose tracing is given in Fig. II.

The ordinary method of taking tracings may perhaps be described with advantage. A "Sanderson's cardiograph," consisting of a shallow cup closed by an elastic membrane, which bears a projecting button, is applied to the apex pulsation, which compresses the air contained in the cup. The pressure is translated by a tube to a "Marey tympanum," which is also a shallow cup closed by an elastic membrane, whose movements are magnified by a lever arrangement. The lever is in contact with the smoked paper of a cylinder revolving at a known speed, whose measures of length are therefore convertible into measures of time. Cardiography is no more than the graphic representation of movements by plus and minus pressures of the heart, against some flexible part of the chest-wall. The cardiograph, like the sphygmograph, is not a magical informant, but a very partial communicator of physical features. Even the skilled use of such instruments is of very small clinical value. Tracings are never the handwriting of delicate pathological states, and only give some features in the hydrostatics of their grave systemic influences. Moreover, much intermediation between a fact and its reading is liable to suppress real features, to introduce erroneous features, and the perfected habit of easy methods tells more than the infrequent use of highly precautioned methods. Sphygmograms by the same operator are rarely comparable, far less so those by different operators; the cardiograph, however useful to the physiologist, cannot add to,

but only confirms the clinical information of the stethoscope. These instruments are sometimes of use in the latter capacity, when a too sanguine expectation does not lead to their abuse.

A word on terminology. The terms systolic and diastolic may relate either to sound or to ventricular event, and have been thus rather loosely employed. Examination of the cardiac cycle has linked the first sound with commencing ventricular systole, the second sound with commencing ventricular diastole. The names systolic and diastolic given to them are justified once for all and contain the proved inference to the phenomenon from its features. The sounds are the features of the event, the event is therefore the tacit inference from the sounds.

In order of clinical observation, abnormal sounds are linked primarily with normal sounds, secondarily with the events which these mark. It is therefore most logical to name such sounds with reference to the normal sounds. The physician who employs systolic and diastolic as the names for sounds of ventricular systole and diastole, repeats each time the independently completed inference from sound to event, and departs from logic if he speaks of a pre-systolic murmur. If he will name the sound by its event, he must use the term auricular systolic, which contains a new and unsettled inference, nor may he allow himself the use of the term post-diastolic.

Yet any accurate description calls for the use of such terms; it is therefore also more convenient to name abnormal sounds according as they precede, replace, or succeed normal sounds, than to state them as the abnormal features of the cardiac events. I have therefore followed the sonal and intersonal nomenclature of Walshe and Haydn, which, while referring heart murmurs to ventricular events, concedes to the necessities of description such terms as pre-systolic and post-diastolic.

ON CATARRHAL PNEUMONIA AND TUBERCLE IN THE HUMAN LUNG.

BY D. J. HAMILTON, M.B., F.R.C.S. ED., L.R.C.P. ED.,
Demonstrator of Pathology, University of Edinburgh, Pathologist to the Edinburgh Royal Infirmary.

(*Continued from page* 269.)

ON TUBERCLE IN THE HUMAN LUNG.

UNDER whatever circumstances tubercle is found in any organ, in man or in the lower animals, one conditional law always holds good as to its development. It is invariably preceded by some caseous deposit, either in the tubercular organ or in some distant part which is in process of softening and which acts as a source of infection. Old as the statement of this law is, it has occasionally, of late, been called in question, either from the caseous source of infection not having been detected, or what is quite as likely, from the original caseous deposit having been mistaken for the tubercle itself.

It is now many years since Villemin (*Comptes Rendus*, vol. lxi. p. 1012) showed that in rabbits an eruption of miliary nodules, in all respects similar in their general characters to so-called miliary tubercle in man, could be induced within a few weeks by the inoculation of cheesy deposits in different parts of the body. The cheesy material was evidently absorbed, and had the power of creating multiple small tumours in distant parts. There is every reason to believe that tubercle in man is induced in the same way. The softened *débris* of a caseous tissue, when absorbed by the blood-vessels or lymphatics, appears to have the power of producing multiple small tumours throughout the system. Some material, probably a ferment, is elaborated in the process of caseation, which apparently acts as a specially virulent irritant upon the tissue into which it is carried, exciting that tissue to abnormally great activity of growth, and producing

the body which we name tubercle. There does not seem to be any preference in the seat of the primary caseous deposit, any tissue, so far as my experience goes, being capable of inducing the formation of tubercle when it caseates.

Both the lymphatic channels and the blood-vessels appear to be capable of absorbing the softened caseous products, and of disseminating them throughout an organ or throughout the system generally. There is every reason to believe that it is originally in connection with the tissues of these two sets of vessels that the tubercles arise, and each seems equally capable of being influenced by the caseous irritation. If the tubercles are locally produced within the same organ as the primary source of infection, the lymphatic channels are usually the seat of their development. But if the tubercle nodules are not confined to the same organ, if they are widely spread abroad throughout the system, the blood-vessels are to be looked upon as the *origo mali*.

It is therefore evident that the lung, from being, in the first place, one of the commonest seats of caseous degeneration, and, in the second place, from receiving the whole of the systemic blood, will be liable to both forms of the disease. The caseous source of infection may be at some distance in a neighbouring organ, and the tubercles alone may be present in the lung, or both the caseous source of infection and the tubercles may cotemporaneously exist within it, the one being the cause of the other.

If these preliminary considerations are not clearly kept in mind, a rational explanation of the course of most instances of tubercle of the lung can never be given. So far as the tubercle is concerned, its structure is alike in both, but as the lung itself differs in appearance in each form of the disease, it will be necessary to consider them separately. To the former, that is to say where the caseous source of infection is in some distant part or organ, and where the tubercles alone are present in the lung, I shall give the designation of "primary tubercle." To the latter, where the tubercle nodules and the caseous source of infection are together present in the lung, I shall give the name of "secondary tubercle." In relation to the lung, the tubercle in the former is the primary, and, in fact, usually the

only disease. In the latter the caseation, from whatever cause arising, is the primary disease, and the tubercle is consequently secondary.

Primary Tubercle of Lung.

It is generally presumed that tubercle of the lung is commoner in children and in youth than in adults. With this statement I cannot agree *in toto*, but would qualify it by saying that *primary* tubercle of the lung is more common in childhood and in adolescence than after the age of twenty-one years, but that *secondary* tubercle is certainly more frequently seen in persons above than below the age of twenty-one. Of the two, secondary tubercle is the commoner. It is therefore incorrect to say that tubercle is *par excellence* a disease of childhood and youth more than of middle life. The remark is true of primary tubercle of the lung, not of secondary.

The reason why primary tubercle is seen in the lungs of children and adolescents rather than in persons older, apparently is, that glandular enlargements with caseous degeneration are more common in the former than in the latter. That strumous subjects are much more liable to glandular enlargements before the age of twenty-one than after it is a fact familiar to every one. It is these softening strumous affections of glands which are the great source of primary tubercular formations in the lung, and hence it is that this variety of the disease is so frequent in youth and in childhood.

It is of the utmost importance before commencing to reason on a supposed instance of tubercle in any organ, and more especially of tubercle in the lung, that there should not be any doubt as to the tubercular nature of the bodies under consideration. So close is the superficial resemblance between tubercle and the tubercle-like affections of the lung, that unusual care is necessary in their investigation. The mere naked-eye examination of a supposed tubercular structure in the lung is not to be looked upon as at all conclusive. I would never pronounce a body to be tubercle in the lung without confirming the macroscopic by microscopic examination. With the microscope the first glance is sufficient to enable the practised eye to detect the true nature of the nodule under

consideration. Of all the neoplasms tubercle is perhaps the best defined, so that there ought not to be any ambiguity in the meaning of the term.

Primary tubercle of the lung is usually called "miliary tubercle," on account of the supposed resemblance of the tubercle nodules in size and shape to millet-seeds. The word "miliary" is employed in antithesis to a supposed variety of the disease in which the nodules have not the miliary character. There is not in reality, however, any difference in the shape or general character of the tubercle nodule in any form of the disease; and hence it would save much misunderstanding if this relic of a bygone system of nomenclature were forgotten, and the term tubercle retained in the pure sense of indicating a tumour with certain specific and constant characters.

On the same grounds it might be asked, why retain the name "tubercle" at all? It certainly has not a very definite signification when taken in its literal sense, but having been used for so long it will be difficult to get rid of it. It is, moreover, after all not very misleading, for seeing that it was originally applied to designate a similarity in the nature of the nodules found consistently in different organs in cases of general tuberculosis, it has on that account a certain specific meaning. It is the inclusion of mere caseous deposits under this term that has caused so much confusion. So long as it is employed in reference to deposits which in their structure and mode of production are alike, it answers all practical purposes. The great danger may be that it is taken in too wide an acceptation, being applied to any tissue which has become caseous. The same confusion formerly existed in regard to the cancerous and sarcomatous tumours, which we now know to be entirely different in their structure and mode of origin. We are also in a position to assert that tubercle has a perfectly distinct and constant structure different from any other known neoplasm, and the name "tubercle" sufficiently expresses this. The sooner, however, such words as "miliary," "crude," "infiltrated," "tuberculoid," and a host of others are removed from the category of pathological terms, the sooner will there be a likelihood of gaining clear and distinct ideas on the subject of the disease itself. The abnormalities of any organ are

comparatively easy to understand; their nomenclature is frequently incomprehensible.

In the following description of primary tubercle in the lung I shall take as my guide a typical instance of the disease, in which its commencement, course, and duration were accurately known. The subject of it was a woman aged twenty, who was delivered of a child thirty-three days before death. Previous to this she had from all accounts been in good health. On the seventh day after delivery she suffered from a rigor, followed by considerable fever, which continued from this time up till that of death. It was also evident from the symptoms that the patient was suffering from peritonitis. The only pulmonary symptoms were those of slight bronchitis. She rallied to a certain extent at one period of the disease, but about seven days before death became worse, and finally died with signs of cerebral meningitis.

The dates of the case are important as bearing upon the age of the tubercular deposits found in the lungs: her illness dated from a week after delivery, and twenty-five days elapsed from this before death took place; so that, even at the utmost, a month had been sufficient to induce all the morbid appearances to be described, and the tubercular growths in the lung could not have been more than from a fortnight to three weeks old.

After death there was found to be extensive peritonitis, of quite recent and also of somewhat older date. In many places, more especially behind the uterus, the peritonitic lymphy effusion had become *caseous*, and here and there this had undergone *softening*. Covering the peritoneum, more especially in regions adjacent to the softening caseous effusion, there were large numbers of grey tubercles in the peritoneum, running in lines along the course of the lymphatic vessels leading to the under surface of the diaphragm. Nearly all the organs showed tubercles of recent origin, and there was extensive cerebral tubercular meningitis. The lungs presented appearances typical of those usually found in cases of primary tubercle, and it is specially to these that I must now direct the reader's attention.

(*To be continued.*)

ON FACIAL PARALYSIS FROM COLD, WITH SPECIAL REFERENCE TO ITS PROGNOSIS.

BY A. DE WATTEVILLE.

THE object of these pages is to attract the attention of the reader to some important, though not sufficiently known, facts concerning a rather common complaint—facial paralysis from exposure to cold. The credit of having led the way in this matter belongs to Prof. Erb, of Heidelberg, to whom the scientific use of electricity in medicine owes so much of its recent progress.

The gist of the following remarks may conveniently be summed up in three propositions :—

1. The primary object of the electrical investigation of nerves and muscles is to discover their nutritive condition. The changes we may discover in them often allow us to localise the cause of paralysis, when this exists; but bear no necessary relation to the degree of paralysis which may be present.

2. The results we obtain from an electrical exploration often allow us to judge of the severity of the lesion; and hence to establish a fairly certain prognosis.

3. From such a prognosis only we can rationally prove or disprove the supposed efficacy of any form of treatment recommended.

I. The only fact electricity reveals us directly is the nutritive condition of the nerves and muscles we are testing. When these tissues are deprived of the special, so-called trophic, influence of certain spinal or medullary centres, they undergo a peculiar neuritic and myositic atrophy; and experience has shown that the abnormal electrical reactions observed in a variety of morbid states depend upon the presence of this degenerative change. When, therefore, in a case of paralysis we use electricity as a means of diagnosing the seat of the lesion, our data are negative, and assist us only in excluding one or more alternative

possibilities; and even where they are positive, they do not enable us to reach a conclusion directly, but only through a process of inference in which of course any link may be erroneous and vitiate the conclusion.

Thus, in an ordinary case of wrist-drop, where we find signs of degenerative atrophy, we cannot assume either a lesion of the musculo-spiral nerve arresting the trophic influence of the cord or a lesion of the trophic centres in the cord itself without taking into consideration all the features of the case, its history and concomitant symptoms. Again, to argue from the presence of a perfect electro-contractility in a paralysed nerve to the non-implication of its trunk, and to the cerebral localisation of the lesion, is to expose oneself to grave mistakes. For instance, a patient came to me with complete right facial paralysis. He complained of having a few days before felt strange sensations on that side of the face, with pains in his head. The next morning he found, to his dismay, his face distorted to the left and immovable on the right. There was also some impairment of the sense of taste on the right side of the tongue. On applying both currents successively, I found that both nerve and muscles reacted on both sides alike. Was I then justified in attributing a cerebral origin to the paralysis without any further investigation? Far from it; apart of the fact that the upper branches of the facial were as completely paralysed as the lower ones—an unusual occurrence in paralysis of this nerve from cerebral cause—I obtained a clear history of exposure to a cold draught, and diagnosed the case as one of peripheral Bell's palsy. The electrical investigation having proved that the nutrition of the muscles was not impaired, and that the nerve had not suffered beyond losing its conductivity to voluntary impulses, my prognosis—which a short time sufficed to justify—was most favourable. Very different was another case in which a similar cause—exposure to cold air during a railway journey—resulted in paralysis of the left facial nerve. Here I found a complete abolition of response, nervous and muscular, to the strongest faradic currents. Strong galvanic shocks failed to stimulate the nerve; whilst the muscles freely responded to the galvanic stimulus; indeed, on the diseased side a much weaker current was necessary to make them contract than on the sound side. But beyond this "quantitative" alteration

in the muscular irritability, there was a corresponding "qualitative" change, which manifested itself by an abnormal response to the negative and positive pole respectively. Healthy muscles react more readily to the negative pole when the current is made, and to the positive when broken. Now, on testing the diseased muscles in this case, I obtained precisely the opposite; the positive pole excited greater contractions than the negative on closing the circuit; the negative greater than the positive on opening it. At the same time the muscular contractions had lost their vigorous, momentary, and well-defined character, and had become slower, almost vermiform, like those of unstriated fibres. From these phenomena and the other circumstances of the case I diagnosed a severe lesion of the facial nerve, leading to its degeneration, with corresponding changes in the muscles; and framed a prognosis in consequence. Six months afterwards hardly any voluntary power had returned, and further progress took place very slowly.

Between the two types of cases just described are often found transitional forms, which are characterised by a simple diminution in the irritability of the nerve tested by both currents, and an abnormal mode of muscular contraction to the galvanic stimulus. The latter does not necessarily show the complete inversion of the normal formula above mentioned. There may be simply increased irritability with a tendency of the diseased muscles to react more readily to the positive than to the negative pole on closing the circuit. The name "reaction of degenerative atrophy," or simply "degenerative reaction," has been applied to the abnormal mode of response of the affected tissues to the electric stimulus. And the form of it where the muscles only present the phenomenon has been characterised as the "partial," whilst that where there is also loss of nervous excitability is called the "complete," type of degenerative reaction. For further details, with diagrams, illustrating the development of these phenomena, and their connection with histological changes in the affected nerves and muscles, I must refer the reader whom it may interest to my *Practical Introduction to Medical Electricity*. My main task here is to show the value of electro-diagnosis in facial paralysis *a frigore* in furnishing data applicable to the prognosis of each individual case.

II. In the three categories of cases just described the loss

of power over the muscles is, from the first, absolute. There is nothing to be learnt, then, from the amount of paralysis, with reference to the depth of the nutritive lesion. On the other hand, it is obvious that the rate of recovery must in a great measure depend upon the amount of tissue change, degenerative and regenerative, involved by that lesion. Now we have seen that the modifications occurring in the electrical reactions are the direct manifestations of the nutritive changes in the diseased structures. Hence it is plain that from these modifications we shall be able to infer the duration of the histological evolution necessary for a return to health.

Experience has shown that the cases where there is no marked change in the behaviour of nerve and muscle to the electric stimuli run a short and favourable course, recovering, as a rule, in about three weeks. The cases where the nutrition of the muscles only has suffered (partial form of degenerative reaction) take a longer time—about six weeks,—whilst those which present the phenomena of the complete reaction of degeneration require three to six months to recover. These periods, of course, cannot be taken to express an absolute rule; for many circumstances, which hitherto have not been referred to any law, may influence the progress. Some "mild" cases recover in a few days, whilst others prove much more refractory; and among those of severer form some recover comparatively rapidly, whilst others take many months, or even years, to complete their evolution. It must not be forgotten, either, that some muscles may remain permanently injured, and pass from the state of paralysis into that of contracture. Yet, allowing for all contingencies, in the great majority of cases the course of the disease conforms itself to a carefully grounded prognosis, such as can only be obtained by accurate, and, if necessary, repeated electrical examination.

III. Electro-diagnosis, then, enables us to foretell in every case, with fair accurary, the approximate duration of the disease; and to warn the patient, if needs be, of taking a too sanguine view of his prospects. But it is also of the highest use in enabling us to judge of the real value of the several plans of treatment adopted in facial paralysis. In a general way it may be said that facial paralysis from cold is a disease which tends naturally towards recovery. In a large number of cases where

a definite prognosis had been framed at the outset, a cure has resulted within the prescribed time without any treatment. It is obvious, from the nature of the lesions which characterise all but the slight form of facial paralysis, that no treatment can be expected to do more than assist the natural process of regeneration, and, possibly, keep the preliminary process of degeneration within certain limits. It is absolutely erroneous to imagine that electrisation, by giving "artificial exercise" to the muscles, will prevent their degeneration. They atrophy not because they are in disuse, but because they are separated from their trophic centres, and the cycle of changes they undergo is absolutely fatal. Similar considerations apply to every form of treatment in Bell's palsy. The cases in which therapeutical procedures were apparently crowned with rapid success were cases where no deep nutritive lesion accompanied the paralysis, and which would have recovered with probably the same rapidity if left to themselves.

I should be sorry, however, to appear a complete Nihilist with reference to the use of electricity in this disease. Electricity fulfils, I believe, and alone fulfils, certain indications of which it is important not to lose sight. In all cases its use is soothing to the patient who often complains of unpleasant sensations in the paralysed region. It tends to hasten the return of the natural tonus of muscles; and this is of special importance in the case of the orbicularis palpebrarum, whose relaxed state exposes the patient to conjunctival inflammation. In the severer cases, experience, as well as every analogy, supports the view that electricity may assist nature in the process of regeneration, and in that of "re-innervation." Its use therefore is indicated not so much at the beginning of the disease as at the time when the downward or degenerative evolution has ceased, and histological reintegration has begun. The most gratifying results, however, are obtained from electrisation in those cases where what I have ventured to call re-innervation is in abeyance. Here nerve and muscle have, to a great extent, recovered their normal constitution; yet the return of voluntary power over the parts is more or less incomplete. It is often surprising to find, even after years have elapsed, what electricity will do here towards the restoration of function in the paretic organs.

ON PRESSURE AND SURFACE DRAINAGE IN WOUND TREATMENT.

BY SAMPSON GAMGEE, F.R.S.E.,

Surgeon to the Queen's Hospital, Birmingham.

S. M., æt. 32, was admitted into hospital under my care, 4th March ult. Pulse, 120; resp. 26; temp. 102°. The left upper limb generally—but especially at and near the elbow—was red, hot, swollen, and very tender. A transverse irregular suppurating wound, $1\frac{1}{2}$ inch by $\frac{1}{2}$ inch, extended from the olecranon to the outer condyle. On wiping off the pus with a pledget of lint, the bottom of the wound was grey.

The circular measurements of the two elbows were—

	Right.	Left.
At point of olecranon . .	$9\frac{1}{2}$ inches.	12 inches.
3 inches above	$8\frac{5}{8}$ "	$11\frac{3}{8}$ "
3 inches below	$8\frac{3}{8}$ "	$9\frac{3}{4}$ "

The injury, I was informed, had been inflicted four days previously, by throwing a glass bottle at the elbow. When first seen by a surgeon, the contused wound contained some bits of glass and a small fragment of the olecranon, which was bare and fissured.

I prepared moist pasteboard splints to immobilise the arm in the extended position. Whilst the patient was lying in bed, I raised the arm vertically, to empty it of blood as far as practicable, covered the limb with absorbent gauze and cotton pads, and with a soft absorbent bandage and even pressure moulded the splints, one on the anterior and the other on the inner aspect. In this application the wound and surrounding parts, for about two inches, were left exposed, and afterwards covered with a separate absorbent pad and compressing bandage, so that these could be changed without disturbing the general apparatus. I secured the arm on pillows with the hand well raised. Seven hours later, the arm quite easy; discharge

through dressings at elbow; the bowels not having been opened for two days, an ounce of castor-oil prescribed.

March 6th (48 hours after admission).—Temp. 103°; pulse, 120; resp. 24. Bowels have acted freely. Arm easy. Apparatus loose from subsidence of swelling. On removal of absorbent pad from elbow (for the first time) it is well soaked with pus, which is quite odourless; wound cleaning at edges. Arm, so far as can be seen, softer and paler. Another absorbent gauze and cotton pad bandaged over wound with increased pressure. On asking the patient immediately afterwards how the arm felt, her reply, noted down, was—"*Beautiful, as if in a glove.*"

March 7th.—Temp. 101°; pulse, 108; resp. 26. Discharge has permeated pad at elbow; on removing the pad, it is found soaked in the centre with odourless pus, bottom of wound clean, surrounding parts much paler and shrunken. Another absorbent pad and compressing bandage applied at elbow.

The next day the woman was delirious, and for a fortnight she continued violently maniacal, requiring the attendance of special nurses day and night. The same dressing continued to the arm throughout, and nothing could be more satisfactory than the local progress. The patient's general state is now (April 7th) quite satisfactory; she is rational, eats well, and gets up daily. The wound is quite clean and superficial, the discharge very much decreased, and the absorbent pad is only changed every fourth day. The limb is of natural shape and colour. The dimensions at the elbow, which can be moved with comparatively little pain, are now:—

		Decrease since Admission.
At point of olecranon	$9\frac{5}{8}$ inches.	$2\frac{3}{8}$
3 inches above	$8\frac{7}{8}$ „	$2\frac{1}{2}$
3 inches below	$8\frac{5}{8}$ „	$1\frac{1}{8}$

The dry absorbent gauze and cotton pads have acted beneficially in two ways—in rapidly draining the discharge from the wound, and acting as an elastic medium for soothing and safe compression. The absorbent cotton is very much more elastic than ordinary cotton-wool, and, when made into pads with absorbent gauze, is a beautifully simple, comfortable, and efficient

surgical dressing.[1] The absorbent cotton bandages, too, are so soft that, with the moistened pasteboard splints and cotton pads, a perfectly fitting and evenly compressing mould can be constructed. Such a compressing mould ensures absolute rest, controls the circulation, prevents extravasation, promotes absorption, and lulls pain. Under diffused elastic pressure, previously inflamed, doughy, and twitching wounded limbs lose their angry redness, soften, shrink, and rest at ease. With the shrinkage discharges lessen and sweeten, and breaches of continuity fill up and consolidate.

In the case of recent wounds, the twofold action of the absorbent and compressing pad, in promoting healing, is strikingly illustrated. It takes up any extravasated fluid so readily as to prevent accumulation and decomposition, while the tendency to effusion is greatly lessened by the contraction of the vessels, which rapidly takes place under very light uniform elastic compression. To illustrate this, place the open hand flat on the table, and on the dorsum of the hand a folded pocket-handkerchief, or, still better, one of my elastic cotton pads; compressing it with the other hand for a few seconds, and then quickly removing it, the skin is seen to be comparatively pale and ex-sanguined. If the experiment be repeated when the hand is raised, the effect is marked in direct proportion to the elevation. It is the combination of perfect rest, easy position, and elastic compression which enables the surgeon most effectually to promote the repair of injuries, by controlling the vital dynamics of the circulation and the phenomena of innervation. Physiological and clinical experiments concur in demonstrating how causes comparatively simple and slight may produce effects great and lasting, especially when judiciously combined.

In a serial so eminently practical as this I am loth to enter into theoretical discussion. I have too much regard for the time of the busy men who look through these pages to encumber them with unnecessary words. But how is it that, of the many surgeons who have of late years paid increasing attention to wound treatment, so few have appreciated, at its true value, the therapeutic action of pressure?

[1] These dressings, with antiseptic preparation for those who prefer it, may be obtained from Messrs. Southall Brothers and Barclay, Pharmaceutical Chemists, Birmingham.

Reviews.

The National Dispensary, containing the Natural History, Chemistry, Pharmacy, Actions and Uses of Medicines, including those recognised in the Pharmacopœias of the United States and Great Britain. By ALFORD STILLÉ, M.D., L.L.D., and JOHN M. MAISCH, Ph.D. 8vo. pp. 1628. London: Churchill.

THIS large work contains an account of the source, preparation, and character, as well as of the physiological action and medical uses, of all the drugs in the British and American Pharmacopœias, and also of a number of others which are not yet officinal in either country. As a book of reference to which one can turn for information regarding drugs to be found in no other work, it is of very great value indeed, but the accounts given of the physiological action are meagre, and in very many instances very imperfect, forming a marked contrast in this respect to the work of Dr. Wood. It was hardly to be expected, however, that in a work of this size the physiological action could be given very fully, without unduly extending the limits of the volume. It will be very useful to those who wish a work of reference containing the pharmacy as well as the pharmacology and therapeutics both of common and unusual remedies.

Handbook of Therapeutics. By SYDNEY RINGER, M.D. Eighth Edition. 8vo. pp. 671. London: H. K. Lewis.

THE well-deserved popularity of this work is shown by the rapidity with which another edition has been called for. The present edition is larger than the former one by twenty-four pages. Four pages of this increase are occupied by a section on dropsy, and about half a page by an article on Duboisia Myoporoides (which by a printer's error is termed Duborsen), the remainder being taken up by slight additions to the other articles mentioned in the work. We need say nothing in its praise. The rapid sale of successive editions already indicates how widely its value is appreciated.

Atlas of Skin Diseases. By Louis A. Duhring, M.D. Philadelphia: J. B. Lippincott and Co. 1879. Parts V. and VI.

Dr. Duhring's Atlas continues to maintain the high standard of excellence which characterised the earlier parts. Parts V. and VI. contain representations of scabies, eczema papulosum and vesiculosum, seborrhœa, herpes zoster, erythema nodosum, tinea sycosis, and a pustular syphilide, all of which are admirable for precision and colour. The Atlas aims at reproducing skin diseases as they are most commonly met with, and will prove of great utility to the general practitioner of medicine. The explanatory text is clear and concise.

A System of Medicine. Edited by J. Russell Reynolds, M.D., F.R.S., &c. (Vol. V., completing the work.) *Local Diseases, continued.* 8vo. pp. 1040. London: Macmillan and Co.

To those unacquainted with the habits of medical authors it may seem strange that the concluding volume of this important work should not have appeared until the first volume had already reached a second edition. But when it is considered that this work has been chiefly written by medical men who have attained a high position in their profession, and whose time is so occupied with professional engagements that they have comparatively little leisure for literary pursuits, the tardy appearance of the work in its completeness is by no means astonishing. It has no doubt been a disadvantage to many possessors of the preceding volumes that the work should, up to the present time, have been incomplete. On the other hand, however, those who at length possess the entire work are gainers by the delay, inasmuch as the articles contained in it are the fruit of more mature thought on the part of the authors.

The present volume contains a continuation of Diseases of the Organs of Circulation, Diseases of the Blood Glandular System, Diseases of the Urinary Organs, Diseases of the Female Reproductive Organs, and Diseases of the Cutaneous System, with an Index to the volume, a list of the chief authors referred to, and a General Index to Vols. I.—V.

Under the head of Diseases of the Organs of Circulation, we have Mediastinal Tumours, Diseases of the Aorta, Aneurism of the Thoracic Aorta, Diseases of the Pulmonary Artery, and Diseases of the Coronary Arteries, by Dr. Douglas Powell; Aneurism of the Abdominal Aorta, by Dr. William Murray; Diseases of Arteries, Diseases of Veins, Cardiac Concretions, Thrombosis, and Embolia, by Dr. J. Syer Bristowe; and Inflammation of the Lymphatic Vessels, by Dr. Russell Reynolds.

Under the head of Diseases of the Blood Glandular System,

there are Diseases of the Spleen, by Dr. J. Richard Wardell; Splenic Leucocythemia, and Hodgkins' Disease, by Dr. Gowers; Addison's Disease, by Dr. Wilks; Exophthalmic Goître, by Dr. Hermann Beigel; Diabetes Mellitus, and Diabetes Insipidus, by Dr. Lauder Brunton.

Under Diseases of the Urinary Organs are included Nephralgia, by Dr. Basham; Calculous Disease of the Kidney, by Drs. Basham and Frederick Roberts; Diseases of the Renal Blood Vessels, Hydro-Nephrosis, Renal Abscess, Tumours and New Growths of the Kidney, and Diseases of the Ureter, by Dr. Frederick Roberts; Hæmaturia and Endemic Hæmaturia, Hæmatinuria and Paroxysmal Hæmatinuria, Albuminuria, Congestion of the Kidneys, Bright's Disease, and Anomalies of position, form, and number of the Kidneys, by Dr. William Roberts; Nephritis and Pyelitis, consecutive to affections of the Lower Urinary Tract, by Marcus Beck, M.S.; and Affections of the Bladder, by Sir Henry Thompson.

Under the head of Diseases of the Female Reproductive Organs, there are Changes in the Shape and Position of the Uterus, Disorders in the Uterine Functions, by Dr. Graily Hewitt; Inflammation of the Uterus, Metritis, Pelvic Hæmatocele, Pelvic Cellulitis, Pelvic Peritonitis, by Dr. W. O. Priestley; Growths in the Uterus, Inflammation of the Ovary, and Ovarian Tumours, by Dr. John Williams.

The Diseases of the Cutaneous System are written by Balmanno Squire, M.B.

All the articles contained in this volume bear evidence of extensive reading and careful writing on the part of the authors, and the most valuable points regarding the causes, symptoms, diagnosis, pathology, and treatment of each disease are given fully and succinctly.

In discussing diseases of the aorta, Dr. Powell mentions that he has found, like other experimenters, that paralysis of the recurrent laryngeal nerves causes dyspnœa, from the paralysed vocal cords being sucked together at each inspiratory effort. This is relieved by galvanisation of the nerves, which opens the glottis. The paroxysmal dyspnœa, observed in cases of aneurism, is considered by him to be sometimes due to extra distension of the aorta, converting a partial into a complete paralysis by exerting greater pressure on the nerve; but sometimes, also, it is due to direct compression of the trachea by the tumour, or the accumulation of mucus at the point of stricture, and sometimes, also, to asthma caused by compression of the pulmonary plexus.

As might have been expected from so accomplished a physician as Dr. Bristowe, the articles which he contributes are good, but the pathology of thrombosis might, we think, have been with

advantage discussed at greater length, and with some reference to Cohnheim's experiments.

In the articles by Dr. Gowers on splenic leucocythemia and Hodgkin's disease, the pathology is very fully discussed, and all the work done by Continental observers seems to have received full attention. The same may be said of Dr. Brunton's articles on diabetes; but we think that in his discussion of the treatment of diabetes mellitus he does not give sufficient credit to the system of skim-milk treatment, a treatment which in some cases is certainly productive of very great benefit indeed, and is, perhaps, especially useful where albumen appears in the urine along with the sugar.

The diseases of the kidney probably constitute the most interesting and valuable part of the volume. The first article on nephralgia, by Dr. Basham, is so admirably done that it can but increase the reader's regret for the untimely death which prevented the author from completing his part of the work, even although his place has been so ably supplied by Dr. Frederick Roberts. His observations on the connection of lithæmia, lithiasis, oxaluria, and hypochondriasis are of great practical value, and the observations which he makes on cases where the pulse intermits, not because there is any organic lesion of the heart, but because the patient is more or less poisoned by the effete material with which his blood is surcharged, are especially important to those who have to treat patients in good circumstances and addicted to free living. He gives the case of a gentleman of this class who remained well so long as he was able to take active exercise, but when laid by in consequence of an accident, and thus rendered unable completely to oxidise the products of his tissue waste by open air exercise, became subject to irregularity and intermittence of the heart's action and such depression of spirit that his mind seemed to be on the point of giving way. Yet these symptoms, which might have been supposed to depend upon serious disease of the heart and brain, were simply due to lithæmia, and disappeared under salines and acids, and especially under open-air exercise on foot and horseback.

The editor has been fortunate in securing such a writer as Dr. William Roberts to do the articles on albuminuria and Bright's disease. He first discusses the detection of albumen in the urine and its significance, and gives an ingenious method, devised by himself, for estimating the amount of albumen. He mentions the existence of modified albumen in the urine, but we think he might with advantage have discussed other forms of albumen which occasionally occur in the urine besides Bence Jones's albumen. He divides Bright's disease into acute and chronic, and subdivides chronic Bright's disease into three forms—the

smooth white kidney, the granular kidney, and the waxy kidney, preferring a classification based on clinical to that based on anatomical characteristics. The first division of the author of acute Bright's disease corresponds to the inflammatory dropsy of earlier writers, to the first stage of Frerichs, to the acute desquamative nephritis of Johnson, and to the acute tubal nephritis of Dickinson. The author appears to agree with Dr. George Johnson that in chronic Bright's disease the muscular walls of the small arteries are really hypertrophied, but at the same time he recognises the merits of Sir William Gull and Dr. Sutton in bringing into prominence the fact that renal affection is not a mere local affair, but is part of a wide-spread tissue degeneration, although he does not give in his adherence to their view, that the pathological change in the arteries consists in arterio-capillary fibrosis.

Space forbids our discussing the other articles contained in this volume, but it may be appropriate to say a few words regarding the work as a whole. Like most other systems of medicine made up of articles by different authors, it is, no doubt, more or less unequal, both in the extent and quality of the articles which it contains, some, possibly, being unduly extended, and others unduly shortened. Some are for the most part composed of the personal experiences and observations of the authors, with too little reference to the work of others, while some articles contain, perhaps, rather much literature, and too little of the results of practical observation at the bedside. Yet, on the whole, the work is a satisfactory one, and, in comparing it with other books written with a similar object, we think it bears the comparison well. The plan of treating the subjects is well adapted—better so, probably, than that of most other large systems,—to meet the ends desired by the English medical man—viz. the successful treatment of his cases. Some foreign systematic works give the pathology and literature of the subjects more fully than the present one, and are therefore useful for those who are engaged in working up the subject of special diseases with the view of making new observations, but for those who wish an account of each disease sufficiently full for all the purposes of practice, and written with a practical aim, we think the system of medicine of which we have now noticed the concluding volume is not surpassed by any other.

Clinic o the Month.

Boro-citrate of Magnesia in the Treatment of Stone and Gravel.—Dr. Koehler, in the *Berliner klinische Wochenschrift*, No. 44, 1879, strongly recommends the boro-citrate of magnesia, a salt obtained from the boracite or stassfurtite recently found in quantities at Stassfurt, and asserts that the solution is very effective in dissolution of stone in the bladder and kidneys, as well as in the treatment of catarrh of the bladder. He points out that Paracelsus, in the sixteenth century, appears to have known and used this substance for this purpose. He called the stone which he used for lithiasis *ludus* or *cevillus*. Van Helmont later insisted on the value of this ludus, and Becker (*Boracit, Geheimmittel des Paracelsus gegen Steine*, 11te Aufl., Mühlhausen, 1868) recommended it in various forms of disease. The author states that for some time he has employed boro-citrate of magnesia as well in stone as in gravel of the bladder and kidneys and catarrh, and with the best results. Boro-citrate of magnesia, as prepared for him, is a white powder of sour flavour without any taste. He orders one or two heaped-up teaspoonfuls with the addition of a drop or two of oil of citron and 120 grams of water, and has a teaspoonful of it taken three times a day in half a glass of water. The cases which he brings forward are, however, very far from being convincing. They are chiefly cases in which renal calculi, which gave rise to colic, passed away a short time after this medicine was administered, or diminution of large vesical calculi after several months' use of this means. Prof. Dittel, in criticising this communication (*Allgemeine Wiener Med. Zeitung*, Dec. 16, No. 50), justly points out that renal calculi sometimes pass away without any preparations, and that writers on alkaline waters are rich in reports of such cases, and very often see very rapid results of the kind. In respect to the second class of cases reported by Koehler, of diminution of the size of stones in the bladder, it is to be noted that he states that he had left a piece of uric acid calculus in the solution of boro-citrate of magnesia, and found it broken up at the end of eight days. Dittel handed the material to Prof. Ludwig, and it was found that after the stone had lain for five days in the solution

it was not at all changed, and, moreover, no uric acid could be found in the solution. Dittel undertakes to continue his experiments, and, if he finds any successful results, to report them. (*The London Medical Record*, Jan. 15, 1880.)

The Physiological Action of Apomorphia Hydrochloras.—Dr. Reichert, in an inaugural thesis, has arrived at the following conclusions in regard to the action of Apomorphia. (1) When locally employed, it is a depressant to all the highly organised tissues of the body. (2) That upon the cerebrum it is primarily a stimulant, secondarily a depressant. (3) That the sensory nerves are paralysed, the paralysis being progressive from the periphery to the centre. (4) That the motor nerves are primarily stimulated, secondarily paralysed. (5) That the loss of voluntary motion is due to narcotism. (6) That the loss of reflex activity is due to a paralysis of the sensory nerves and a stimulation of the inhibitory reflex centres of the spinal cord. (7) That the convulsions are principally spinal, and due to a paralysis of the inhibitory reflex centres of the spinal cord. (8) That the motor conducting tracts are paralysed before the motor nerves succumb. (9) That the hyperæsthetic condition which is sometimes observed to exist after the total abolition of reflex activity is due to a depression of the inhibitory reflex centres of the cord. (10) That the increase of pulse rate is due to a stimulation of the accelerator fibres of the vagus, and a decrease to a depression of the heart muscle. (11) That the increase of respiration rate in dogs and cats is due to a stimulation of the peripheral vagi fibres, and in rabbits to a combined stimulation of the vagi centres. (12) That the primary and secondary fall of blood-pressure is due to a direct depressant action on the heart, and the temporary rise to a stimulation of the vaso-motor centres in the medulla. (13) That the temperature is primarily increased, secondarily diminished. (14) That both the voluntary and involuntary muscular systems are depressed, and finally paralysed. (15) That it is a cardiac depressant. (16) That the secretion of the salivary glands is markedly increased. (17) That the emesis is due to a stimulation of the vomiting centres in the medulla oblongata, and that the drug acts primarily as a stimulant, secondarily as a depressant to these centres. (18) That absorption takes place very rapidly through all parts of the body. (19) That it is probably eliminated by all the secretions, and that the elimination takes place rapidly. (20) That the most characteristic test is the solution of gold chloride, which gives a purple precipitate, which may be distinguished from the reaction with a tin salt, by the precipitate changing to a brown when it is boiled. (21) That the dilatation of the pupil is due to paralysis of the motor

occuli centres. (22) That there are no characteristic lesions found after death. In no post-mortem examination (of which nearly twenty were made) was there the slightest evidence of that hyperæmia of the pons varolii which is said by Quehl to be a characteristic lesion. These conclusions were arrived at from a study of the results of over 200 experiments. (*The Philadelphia Medical Times,* Jan. 3, 1880.)

The Therapeutical Action of Cold.—Dr. Thomson, considering cold as a vascular tonic, believes that it may be employed remedially either generally or locally. When the circulation is feeble, and there is loss of muscular power, the general use of cold, as by the dip, shower, or sponge bath, will arouse the heart, restore arterial tone, and thereby improve the nutrition of the whole body. A thorough reaction should however follow the bath, which should never be allowed to cause exhaustion by its too frequent or too protracted use. When the irritant effect produced by the cold water alone is not sufficient, salt or some mild rubefacient may be added. If the patient is too feeble to bear even the sponge bath, simple exposure of the surface of the body to cold air will often prove beneficial. In all cases reaction may be assisted by friction with a rough towel. A cold douche to the nape of the neck is indicated in the following conditions. (1) When after sunstroke, the arteries of the head remain dilated, and there is headache and dizziness on exertion or exposure to the sun. (2) In all cases in which headache is confined to one side, and is attended by dilatation of one temporal artery and suffusion of one eye. (3) In false croup or the crowing respiration of children. (4) In tinnitus aurium, when the throbbing is synchronous with the beating of the heart, and the tympanic arteries are distended, the cold douche to the nape of the neck, aided by the internal use of hydrobromic acid, may afford relief. Sponging the chest of a phthisical patient with cold water lessens the susceptibility to cold. Local applications of cold water are useful in promoting absorption of inflammatory effusions and exudations in the sub-acute and chronic stages; also in restoring the balance of the circulation in the liver and spleen when enlarged in malarial poisoning. The hip or sitz bath is useful in hæmorrhoids, prolapse of the rectum, and congestion of the pelvic viscera. Cold is also of great use as a styptic, since it acts upon the vaso-motor nerves, as an antiphlogistic to arrest acute or to restrain threatening inflammation, as an anæsthetic, and as an antipyretic. (*The New York Medical Record,* Jan. 3, 1880.)

Poisoning by Chlorate of Potash.—It appears to be certain that this reputed harmless salt, if given in the very large doses which have lately been recommended, especially in

diphtheria, may produce poisonous and even fatal results. Dr. Jacobi, of New York (*New York Medical Record*, vol. xv. No. 11), has met with a large number of cases among children in his clinic in which the symptoms partly resembled those of acute nephritis; and Dr. F. Marchand has recently published four cases observed by himself (*Virchow's Archiv*, Bd. 77, Heft 3), three of them fatal, and has found that the post-mortem appearances and the microscopic alterations of the blood coincided with those observed in animals experimentally poisoned with chlorate of potash. The ages of Dr. Marchand's patients ranged from three to seven years. They were treated for mild pharyngeal diphtheria and stomatitis with doses of the salt amounting in one case to ten grams in less than twenty-four hours, in another to twelve grams in thirty-six hours, and in a third to twenty-five grams in thirty hours. The symptoms were vomiting, hæmaturia, a more or less icteric tint of skin, rapid wasting of flesh and strength, delirium, and coma. The urine contained quantities of disintegrated blood corpuscles. The blood itself was of a remarkable chocolate colour, which did not alter on exposure to the air. The same colour can be produced artificially by adding chlorate of potash to blood and allowing it to stand for some hours. If the proportion of the salt be considerable, the blood assumes a syrupy or even a gelatinous consistence; and under the microscope the red corpuscles are found to have acquired a peculiar glutinous character, so that they tend to agglomerate into masses. The spectroscope further shows that the lines characteristic of hæmoglobin have been replaced by a distinct absorption-band in the red part of the spectrum, due to the conversion of the hæmoglobin into *meth*-hæmoglobin, an oxidation product of the former, discovered by Hoppe-Seyler. The poisonous effects of chlorate of potash are therefore, in all probability, the result of its oxidising action on the red corpuscles. The *débris* of the latter are either excreted by the kidneys (in which case they colour the urine brown), or they accumulate in the tubules of the renal cortex and cause death by suppressing the secretion of urine and producing a condition of "uræmia." The kidneys themselves are enlarged, and their surface is brown, but they exhibit no inflammatory appearances, the main alteration being the infarction of their tubules with corpuscular detritus. Dr. Marchand's paper is an important one, and it is clear from it that large doses of chlorate of potash are unsafe in childhood. Considering, however, what excellent results can be obtained, especially in stomatitis, by small doses of it, and how rarely any untoward result has occurred if the ordinary method of administration is adhered to, we cannot agree with the writer that the use of this drug ought to be discontinued in treating children. It would be absurd to put

aside so valuable a remedy because it does harm when abused. The same argument would apply equally to nearly every medicine in the Pharmacopœia. (*Medical Times and Gazette,* Dec. 6, 1879.)

Treatment of Rheumatism by Iodide of Potassium and Opium.—Dr. Barton calls attention to the decreased use of the iodide of potassium treatment for acute rheumatism in this country. He states that he has been in the habit of using—both at home and abroad—iodide of potassium in large doses, five to twenty grains every three hours, with ten grains of Dover's powder at night. This practice Dr. Barton has pursued since the remedy was first introduced nearly thirty years since, and by it many hundred cases have been treated without disappointment or failure. The treatment, even in acute articular rheumatism, lasts only a week or ten days. Mustard plasters, if applied during the first day that the pain is felt, will stop rheumatism at once without the use of any medicine; where mustard fails, blisters may be employed. In rheumatic inflammation there is a deposit of lymph in the joints and tissues, which, if not removed speedily, becomes hard and organised, causing severe pain by its pressure. Iodide of potassium has the power of removing this deposit by absorption, and it has the further great advantage of not exposing the patient to cold, as did the old calomel and opium treatment, by opening the pores of the skin. Another remedy which appears to be much neglected is opium, which possesses very great power in subduing inflammation. (*The Lancet,* Feb. 14, 1880.)

The Treatment of Whooping-Cough.—In a paper read before the Medico-Chirurgical Society of Glasgow, Dr. Allan arrived at the following conclusions: Whilst he does not deny that alum, myrrh, quinine, chloral, croton chloral, bromide of potassium, lime-water, inhalation of turpentine, and rubbing of the spine with belladonna liniment, may have a certain value in the treatment of whooping-cough, he is of opinion that none of them has any claim to the title of a specific. The value of hydrocyanic acid, however, has not yet been sufficiently tested. Chloral hydrate is evidently of use, and in severe cases should have a fair trial, as should also croton chloral. In infants rubbing of the spine with belladonna liniment should be practised; but fresh air, tonics, nourishment, and warm clothing should have the first place assigned to them in the treatment of this disease. The following propositions for the treatment of whooping-cough are submitted. (1) As far as possible, Dr. M'Lean's "open air" treatment should be carried out, care being taken that the patient is warmly clad in flannel, and regard being had to the weather. (2) The patient should have a light and nourishing diet, and if

of scrofulous diathesis, cod-liver oil and syrup of iodide of iron should be administered. (3) In young children rubbing of the spine with belladonna liniment should not be neglected; and in cases where the paroxysms are frequent and severe, recourse should be had to chloral hydrate, or perhaps to croton chloral. (4) The patient should be protected from sudden changes of temperature, and emotional excitement should be carefully avoided. (*The Glasgow Med. Journ.*, February, 1880.)

The Administration of Ergot in Labour.—Dr. Glynn Whittle thinks that there is no doubt that ergot judiciously administered will often save a lying-in woman from the necessity of a forceps delivery. If there is reason to fear post-partum hæmorrhage, ergot should always be given before the child is born. The fifteen- to thirty-minim range of the Pharmacopœial liquid extract is practically useless, but there is a limit to the dose which it is desirable to give. Two fluid drachms may be mentioned as a maximum, but occasionally it is justifiable to repeat this quantity. Dr. Whittle also lays down the following rule in regard to the administration of ergot. Never administer ergot until the labour is so far advanced that it could, if necessary, be easily finished with the forceps. In cases where tonic uterine contraction follows, threatening the life of the child, but not terminating the labour, recourse may then be had to the forceps. If the placenta happens to be morbidly adherent, the danger of the complication may be greatly augmented by post-partum increased uterine contraction, due to the influence of ergot, and of such a case Dr. Whittle quotes an instance which occurred in his own practice. (*The Dublin Journal of Med. Sci.*, Feb. 1880.)

The Treatment of Chronic Dysentery.—Dr. Ralfe states that rest and strict attention to diet are essential to the cure of chronic dysentery. So long as there is tenesmus and much straining, the patient should be confined to bed, or at least remain in the horizontal position. When the stools become feculent, he may be allowed to sit up for a few hours daily, but till the stools have become consistent, he should not be permitted to go out of doors, and even then only in dry and warm weather. Exposure to cold and damp almost invariably causes a relapse. Nourishment should only be given in small quantities at a time. When the symptoms are not acute, beef-tea must be chiefly relied on; and if the exhaustion is great, fluid extract of meat or juice of raw beef must be freely administered. As the more urgent symptoms subside, boiled fish may be given and then minced meat (made from fresh, not cooked, meat). The effect, however, of the change to the more solid diet should be carefully watched, for if given too soon, or in too large quantities, it will provoke a relapse. The best way is to begin with a very small ration, and

to increase it daily. Farinaceous food should be given in very small quantities, if at all. The digestive powers being usually enfeebled in chronic dysentery, some portion of the starchy matter may escape conversion into sugar, and, by decomposition in the large intestine, the unconverted amylaceous material will give rise to flatulence and to the formation of lactic acid. The same caution is necessary in regard to milk, which, if not speedily absorbed, rapidly undergoes lactic acid fermentation. Coffee and alcohol in any form are injurious, and should be abstained from. Fresh fruits in small quantities and lime-juice are beneficial, especially if there is a scorbutic taint, which is very common. All cases of chronic dysentery complicated with constitutional conditions, such as syphilis, ague, anæmia, scurvy, and the like, call for appropriate treatment in addition to that required for the dysentery. As a general rule, too much importance cannot be laid on the necessity of watching for the first indication of a relapse, for on its early recognition and prompt arrest depends the ultimate success of all treatment of chronic dysentery. (*The Lancet*, Feb. 28, 1880)

Danger attending the Use of Salicylic Acid in Acute Rheumatism.—Dr. Maclagan draws attention to the fact that in acute rheumatism the heart is apt to be inflamed. Attention is usually concentrated on the membranes; but the muscular substance also suffers. When severe, myocarditis is apt to be fatal, and is frequently recognised in the post-mortem room. In the mild form it is much more common than is usually supposed. It may exist independently of the membranes. In all forms it produces softening and weakness of the muscular substance. Salicylic acid, no matter whether given alone or in combination with soda, exercises a depressing action on the heart. This action is by no means general, and is probably due to some idiosyncracy of the affected individuals. If this depressing action be produced in one in whom the heart is physically sound, no great harm will be done. With the omission of the drug, the depression will soon pass off. But if it be produced in one who is already the subject of rheumatic myocarditis, an ailment which is not easily recognised during life, and in whom there exists, therefore, softening and enfeeblement of the ventricular walls (for the left ventricle is the chief seat of such inflammation), the depression is likely to be alarming, and may be fatal. To form an adequate estimate of the nature and extent of the dangers attendant on the administration of salicylic acid in acute rheumatism, we must recognise, first, the tendency of the rheumatic poison to produce inflammatory softening and weakness of the muscles of the heart; and, secondly, the tendency of salicylic acid to depress that organ. It is in the combination of these

two that the danger of the drug lies, and it is to the absence of the tendency to produce such depression that the superiority of salicin to salicylic acid is to be attributed. (*Ibid.*)

On the Treatment of Metrorrhagia by Infusions of Black Coffee.—Dr. Desprès (*Abeille médicale*) recommends the use of this method, which, he says, has already succeeded with him in three severe cases. The first was a case of metrorrhagia following confinement, which had resisted all the ordinary methods. The second was a case of metrorrhagia due to anæmia. It had likewise resisted all treatment. The third case was observed in a young woman, aged 26, subject to metrorrhagia, recurring every fifteen days, and lasting eight days at a time. Rest in bed and cold compresses had not produced any result. Desprès gave from three to six cups of strong coffee daily. In this dose it produced agitation, sleeplessness, sometimes even a sort of intoxication. (*The London Medical Record*, Feb. 15, 1880.)

Influence of Phosphorus upon the Urine.—A series of experiments undertaken by M. Cazeneuve, the results of which have been communicated to the Académie des Sciences, seem to show that phosphorus, given in toxic doses, increases the amount of urea, of phosphoric acid, and of sulphuric acid, and also the total excretion of nitrogen and of iron. The observations were made upon dogs and cats, and the following serves as an example of the experiments. The daily excretion of a dog having been found to be about 2·5 grams of urea, ·15 gram of phosphoric acid, ·18 gram of chlorides, nitrogen 1·26 gram, and no iron: a centigram of phosphorus, dissolved in oil, was injected, and in a few days the daily secretion of urea was 7·5 gram, of phosphoric acid ·88 gram, of chlorides ·55 gram: the total amount of nitrogen being 4·9 gram, and the quantity of iron appreciable. There was a trace of albumin, but no blood or bile, although urobilin was present. The excretion of each constituent gradually lessened, and bile pigment appeared in the urine. The excretion having fallen until it was considerably below the normal, 200 grams of milk were given, which had the effect of raising the excretion of each substance almost to the point reached immediately after the phosphorus had been injected. Phosphorus is supposed, when given in toxic doses, to destroy the red blood corpuscles, and such destruction seems to explain the change observed in the urinary secretion. Modern physiology is inclined to regard the liver as the chief seat of the formation of urea; and M. Brouardel has drawn an argument for this theory from the fatty degeneration of the liver, which is produced by the administration of large doses of phosphorus. M. Cazeneuve believes that his results support the theory. (*The Lancet*, Jan. 31, 1880.)

Extracts from British and Foreign Journals.

Drugs in Insanity.—Dr. Wilkie Burman, in a paper on the treatment of acute and curable cases in asylums, read before the Medico-Psychological Association appeals to medical superintendents to make a larger use of alkaloids and other potent remedies in the treatment of the insane. The discussion which followed cannot have been very encouraging to Dr. Burman as far as this part of his paper was concerned, as most of the speakers "damned with faint praise," or unsparingly maligned the practice of medical treatment by drugs in dealing with the insane. Some gentlemen who do know, some who ought to know, and some who cannot know the merits of such a question, spoke so as to give the impression that in their opinion medical science had at present virtually nothing to do with the treatment of insanity. In fact, one of the superintendents of our large asylums (it is to be hoped that at a later period of his life he may be thankful that the description is not more definite) is reported as having said that, "If Dr. Burman's recommendations with regard to treatment by drugs were followed out, there would be an increase in the number of chronic cases, and especially in very troublesome ones, for the most troublesome cases of insanity were those which had been manufactured by the improper use of drugs." It would be useful to have more authority than an *ipse dixit* for this statement. It would be instructive to know where the experience which led to it was acquired, and why it is necessary to assume so decidedly that the use of remedies by asylum physicians is so certain to be an improper one that Dr. Burman's suggestions regarding the *use* of drugs should be summarily criticised as likely to lead to the disastrous consequences ascribed to the *abuse* of them. (*Journal of Mental Science.*)

Therapeutic Action of Sulphate of Cinchonidin.—M. Poncet had occasion during his stay in Africa to administer sulphate of cinchonidin to patients suffering from intermittent fever. He noted with care the results obtained, which do not agree with those arrived at by M. Laborde, based upon

experiments performed on animals. According to M. Laborde sulphate of cinchonidin possesses a well marked convulsive action. M. Poncet, however, administered the drug to the greater number of his patients in the very large dose of 4 grams per diem; but in no case did they present any symptoms of intoxication. The only appreciable effect was a marked slowing of the pulse rate, but no symptoms of any convulsive action presented themselves. (*Le Progrès médical*, Feb. 7, 1880.)

Treatment of Abdominal Disease by Gabian's Oil Capsules.—The progress of experimental medicine does not permit us to refer to clinical data alone for the purpose of determining the value of a remedy. For it is not sufficient to say that it cures a disease, since what is in reality desired to be known is how it cures. A year ago M. Blache introduced at a meeting of the Therapeutical Society a new remedy proposed by M. Gardy, a chemist in Paris. The substance consists of crude petroleum, whose flavour is masked by admixture with jujube paste. The results attained by the use of this remedy in the hands of Dr. Blache go far to confirm the reputation which petroleum has attained in cases of abdominal diseases. In fact, in the oil country in America diseases of abdominal origin have almost disappeared amongst the people who live in the midst of these salutary exhalations. In the neighbourhood of the oil works, chronic bronchitis, asthma, and catarrhal bronchorrhœa have been successfully treated by this remedy. In the Beaujon Hospital the capsules have been tried with success. In those cases in which the secretion obstructs the bronchia the remedy cures by diminishing such secretion after a few days, whilst the inflammation in the neighbourhood of laryngeal granulations which gives rise to the fatiguing cough is relieved, the granulations themselves being in some cases absorbed. In the onset of asthma also the dyspnœa is prevented, and in the initial period of phthisis the symptoms may be materially relieved. The capsules are supposed to act as follows. When they are ingested, they pass into the stomach, and their external coat is then digested, the oil is set free, and from its great volatility is absorbed through the gastric mucous membrane; the remedy thus gains access to the circulation, without causing any digestive effort, without any necessity for solution, or even for emulsification. The oil probably acts as a therapeutic agent, like so many of the balsams, during the process of its excretion. A series of careful experiments were made to determine the path by which it left the body, the result being that the oil is excreted by the lungs, since it is volatilised at the temperature of the blood. In this way are explained the beneficial effects of the remedy: it is necessary however that the oil used should

be crude petroleum as it comes from the wells of Pennsylvania, and that it should not have undergone any refining process, by which its value as a therapeutic agent is in great measure destroyed. (*Le Progrès médical*, Feb. 7, 1880.)

Atropin in the Treatment of Chronic Enteritis amongst the Insane.—Dr. Moreau, of Tours, states that Dr. Dufour, profiting by the experience of Professor Vulpian in the employment of atropin against the sweats in phthisis, bethought himself of using this drug to check sialorrhœa amongst the insane. In the service of Dr. Moreau at the Salpêtrière the undoubted efficacy of this drug against excessive salivation has been ascertained; and as a confirmation of the value of the treatment, attention is here called to another point. Having under his care two women, one suffering from dementia, the other a general paralytic, attacked with intractable serous diarrhœa, which had resisted all ordinary methods of treatment, he gave pills containing ½ to 1½ minim of atropin to the patients, without there being any necessity to increase the dose, as in from four to six weeks the diarrhœa was arrested. In the paralytic, the treatment having been interrupted in consequence of a remarkable amelioration, the diarrhœa reappeared. The atropin pills quickly checked the relapse. As a measure of prudence the use of the drug was continued for some days after the complete cessation of the diarrhœa, and so far the amelioration has been maintained. (*Les Annales med. psychol.; Dublin Journal of Med. Sci.*, March, 1880.)

Effects of Intravenous Injection of Chloral, Chloroform, and Ether upon the Circulation.—M. Arloing recently read a paper before the Académie des Sciences of Paris as to the comparative effects upon the circulation of intravenous injections of chloral, chloroform, and ether. The author injected into the veins furthest removed from the heart solutions of chloral (·5 per cent.), and solutions of chloroform and ether (·2 per cent.). He then found that the heart beat was greatly strengthened by the chloroform, and that chloral and ether caused a fall in the pressure of the right ventricle, whilst chloroform increased this pressure. Again, chloroform and ether increased the force of the systole, whilst chloral diminished it. From these observations the conclusion was drawn that the pulmonary circulation is rendered more active by chloral and ether, whilst it is retarded by chloroform. It was also noticed that the following changes occurred in the peripheral circulation:—(1) The flow of blood in the capillaries, which was slightly slowed at the commencement of chloralisation and etherisation, was much accelerated towards the end of the anæsthesia. (2) The flow, after undergoing a temporary increase in rate, diminished at

the beginning of the chloroform narcosis; it afterwards, however, increased gradually, though it did not regain its normal rapidity. It was also found that chloroform produced anæmia of the cerebral vessels, whilst ether and chloral caused hyperæmia of the brain. (*Arch. gén. de Méd.*, Oct. 1879.)

Short Directions for Lister's Dressings.—In some of the American hospitals the directions for carrying out Lister's treatment are thus conveniently and tersely stated:—(*a*) *Before and during operation.*—(1) Carbolic acid spray. Steam passing through a solution of 1 part of carbolic acid in 30 parts of water. As it issues from the jet, the solution contains about 1 part of acid and 40 of water. (2) Sponges, hands of operators, &c., dipped in solution of carbolic acid (1 in 20). (3) Instruments covered with oil, containing one-tenth part carbolic acid; some are dipped into or kept in watery solution (1 in 20). (4) During intermission of spray the wound is covered with a cloth dipped in carbolic acid solution (1 in 20). (*b*) *After operation.*—(1) A strip of lint soaked in an oily solution of carbolic acid (1 in 10), or a pure rubber drainage tube, similarly treated, is left hanging from the wound during the first (and if necessary following) days. Either of them are cut off flush with the edge of the wound. (2) Over this is placed the protective, into which a small hole is cut, corresponding with the end of the drainage tube. The protective consists of a layer of oiled silk, coated on both sides with copal varnish, and afterwards brushed over with dextrin, which latter enables it to become uniformly moistened when dipped into solution of carbolic acid (1 in 40). It is thus immersed just before being laid upon the wound, and is intended to prevent irritation, which would be caused by the actual contact of the antiseptic dressing with the wound. (3) Two or three layers of gauze dipped in a watery solution of carbolic acid (1 in 40) are next applied. Then (4) seven layers of the antiseptic gauze, being a cotton fabric of open texture impregnated with a mixture of 5 parts resin, 7 parts paraffin, and 1 part carbolic acid. (5) Over this is applied the mackintosh, which is about 1 inch less in size than the gauze. (6) Then another layer of antiseptic gauze is applied; and, finally, (7) carbolised bandages, sufficient to retain the dressings, &c. (*The London Medical Record*, Oct. 15, 1879.)

A Method for Observing the Circulation of Blood in Man.—An ingenious method has just been devised for actually observing the circulation of the blood in man. Hitherto, except in the case of Purkinje's experiment, in which the observer can see the circulation in his own retinal blood-vessels, the evidence of circulation in the human subject has been entirely

circumstantial, derived from the facts of structure of the circulatory organs, and from the manner in which the blood flows from several arteries and veins. But by means of a simple arrangement, invented by Dr. C. Hüter, of Greifswalde, it is now possible to witness the actual flow in the blood-vessels of another person, and that with sufficient accuracy to detect any abnormality in the circulation, and so to obtain invaluable assistance in the diagnosis of disease. In Dr. Hüter's arrangement the patient's head is fixed in a frame something like that used by photographers, on which is a contrivance for supporting a microscope and a lamp. The lower lip is drawn out and fixed by means of clips upon the stage of the microscope, with its inner surface upwards; a strong light is thrown on this surface by a condenser, and the microscope, provided with a low-power objective, is brought to bear upon the delicate network of vessels, which can be seen in the position indicated even with the naked eye. The appearance presented is at first as if the vessels were filled with red injection. But by focussing a small superficial vessel, the observer is soon able to distinguish the movement of the blood stream, rendered evident by the speck-like red corpuscles, the flow of which in the corkscrew-like capillaries is said by Hüter to be especially beautiful. The colourless corpuscles are distinguishable as minute white specks occurring now and again in the course of the red stream. Besides the phenomena of the circulation, the cells of pavement-epithelium lining the lip, and their nuclei, can readily be distinguished, as well as the apertures of the mucous glands. Besides the normal circulation, various pathological conditions can be observed. By a pressure quite insufficient to cause pain, the phenomena of blood stagnation—the stoppage of the flow, and the gradual change in the colour of the blood from bright red to purple—are seen. A momentary stoppage is also produced by touching the lips with ice; a more enduring stasis by certain re-agents, such as glycerin or ammonia. Hüter states that he has already proved the great use of "Cheiloangioscopy," as he calls the new process, in his medical practice. The variation in the blood-flow and in the diameter of the vessels, the crowding together of the red corpuscles, the increase in number of the white corpuscles occurring in certain diseases, all these may be observed readily and exactly. It will, indeed, be at once obvious how great is the importance of a method like this, by which an actual observation of the circulation is made possible, especially when it is borne in mind that even the rough and ready method of feeling the pulse affords a valuable indication of the state of health. (*Centralblatt f. die. med. Wiss.*, Nos. 13 and 14, 1879; *The Nineteenth Century*, Oct. 1879.)

The Results of Chronic Catarrh of the Cervix, with the Method of Treatment.—Dr. Hofmeir records some extremely interesting cases, and gives an account of the treatment he has employed. The author maintains the frequent occurrence of relative stenosis of the external os uteri in cases of cervical catarrh. In consequence of this he holds there is produced accumulation of mucus and sacculation and distension of the upper part of the cervical cavity, with dysmenorrhœa and sterility as results. In a large number of cases of cervical hypertrophy, Hofmeir asserts that he has observed this state of matters. Its existence can only be demonstrated by laying the vaginal portion of the cervix freely open by lateral incisions. This he recommends to be made after carefully washing the vagina with solution of carbolic acid. So soon as the cervix is freely opened, a large lump of tough mucus is found to occupy and distend the sacculated cavity. The cavity will usually admit with ease the index finger, and the mucous membrane lining it may be either flattened out or thrown into the normal abor vitæ folds. Hofmeir is not very specific as to the condition of the inner os, but one gathers from his statements that he found it also dilated. The treatment of such cases recommended by Hofmeir is free incision, with antiseptic precautions, down to the junction of the vaginal portion of the cervix on each side; removal of the diseased mucous membrane at the edge of the outer os; formation of a new outer os by sewing the mucous membrane of the cervical cavity to the mucous membrane of the vaginal surface of cervix; and, finally, bringing the edges of the lateral incisions together by means of sutures, as in Emmet's operation. (*Zeitschrift für Geburtshülfe*, Bd. iv. p. 330.)

Lead Palsy.—Friedlander (*Virchow's Archiv*, 1879, p. 24), *à propos* of a fatal case of lead paralysis with muscular atrophy, the details of the autopsy in which he gives with great minuteness, thinks that the lesions he found authorise him in laying down the following conclusions. Lead causes the appearance of a functional disturbance of muscle, to which is soon added a disturbance of nutrition, characterised by the proliferation of the nodule and the diminution of the volume of the muscular fasciculi. Secondary degeneration of the nervous fasciculi supplying the affected muscle then follows. From this destruction of the nervous trunk paralysis results, and this paralysis, which is peripheral in character independently of any modifications already undergone by the muscle, causes its rapid atrophy. Dr. Dejerine also has recently laid before the Société de Biologie the results of his researches on the same subject. In three cases out of five he found degeneration of the medullary roots. The anterior cornua were not affected. (*Dublin Jour. of Med. Sci.* Oct., 1879.)

Influence of Vichy Water on Digestion.—M. Leven read before the Société de Biologie of Paris an account of certain experiments which he had recently made in conjunction with M. Sémerie in regard to the action of Vichy water upon the digestion. The first effect of the injection of Vichy water was found to be a very marked congestion of the liver. In an animal which had drunk 300 grams of the water, the weight of the liver was found after a short time to have increased by 80 grams. Experiments were also made to determine whether Vichy water aids the digestion of foods; a dog was fed upon 200 grams of cooked beef and 150 grams of pure water, and was killed at the end of three hours, when all the food was found in the stomach. A second dog was then fed with the same quantity of meat, but the fluid was replaced by 150 grams of Vichy water, and it was found that at the expiration of three hours 76 grams of the food had disappeared from the stomach. Experiments upon the digestion of bread gave analogous results: thus the stomach of a dog who had eaten 200 grams of bread contained three-fourths of the whole quantity consumed after the expiration of five hours, whilst a dog who had eaten 200 grams of bread, and had drunk 150 grams of Vichy water, had almost finished its gastric digestion in five hours, since only 50 grams remained. (*Le Progrès médical*, Dec. 27, 1879.)

Tuberculosis Neonatorum.—Dr. Alois Epstein, in a paper published in the *Prag. Vierteljahrsschr. f. prakt. Heilk.*, 1879, p. 103, attempts to prove that tuberculosis is an infectious disease, and that it is transmitted by heredity, and more indirectly by the absorption of disease germs. He bases his theory upon facts observed in phthisis occurring in very young children. The author attaches great importance to the influence of the mother upon the infant after birth, but he also allows that the surroundings also possess considerable importance. In every case where the child of a mother suffering from tuberculosis was given to a healthy nurse, it survived, whilst those nursed by the mothers invariably died. Reich also observed a somewhat similar result in Breisgau, where a midwife with tubercle practised direct insufflation upon ten children, every one of whom died with symptoms of tuberculous meningitis. Dr. Epstein believes that the infection is conveyed through the milk. As a result of this theory it follows that a child should not be nursed in such cases by its mother; and that in selecting a nurse the greatest care should be exercised to eliminate all chance of phthisis. A few points are also appended in regard to the diagnosis of tuberculosis in children. The diagnosis presents considerable difficulties. Expectoration, hæmoptysis, and cough are wanting at least in the first stages of the disease. At a late period, however, a

cough may occur, which is dry, painful, and resembles whooping-cough. Night sweats are generally absent. In one case the author has noticed an abundant but fœtid sweat upon the face. The children are thin, although they are constantly at the breast; there is, as a rule, no fever, but in cases in which it is present, it does not exhibit any special characteristics. The skin is flabby and brown. Percussion can only be performed with difficulty, and gives obscure indications. Signs of a capillary symptomatic bronchitis can scarcely ever be distinguished by auscultation; in some cases a sound is caused by the compression of the bronchi by caseous glands. Finally the author holds that the diagnosis of tuberculosis and chronic broncho-pneumonia is almost impossible. (*Archives générales de Médicine,* Jan. 1880.)

Microscopical Studies on Cutaneous Inflammation.—Dr. Heitzmann, of New York, in his paper presented at the last meeting of the Dermatological Association, offers, as the results of his studies, the following conclusions:—(1) In epithelium the first step of the inflammatory process consists in an increase in the living matter both in and between the protoplasmic bodies; the former produces the coarser granulation of the epithelia, the latter the thickening of the so-called "thorus" in the cement substance. Any particle of living matter, both in the epithelia and between them, through continuous growth, may lead to a new formation of epithelial elements, with the termination in hyperplasia of epithelium (psoriasis, squamous eczema, horny formations, &c.). (2) In connective tissues the first manifestation of the inflammatory process is the dissolution of the basis substance and reappearance of the protoplasmic condition. By this process and the new formation of medullary elements, which may start from any particle of living matter, the inflammatory infiltration is established. The sum total of the inflammatory elements remain united with one another by means of delicate offshoots, and represent an embryonal or medullary tissue. If the new formation of medullary elements be scanty, the resolution is accomplished by re-formation of basis substance (erythema, erysipelas). If, on the contrary, the production of medullary elements be profuse, a new formation of connective tissue will result (hyperplasia scleroderma, elephantiasis, &c.). (3) The plastic (formative) inflammation may be accompanied by the accumulation of a larger amount of a serous or albuminous exudation in the epithelial layer (miliaria, sudamina, herpes), or in the connective tissue of the derma (urticaria). In both instances complete resolution will ensue. (4) Suppuration in the epithelial layer of the rete mucosum is produced by an accumulation of an albuminous or fibrinous exudation, by which a number of epithelia are destroyed, and by new formation of

pus corpuscles from the living matter of the epithelial elements themselves. Epithelial suppuration heals without the formation of a cicatrix (eczema madidans and pustulosum; impetigo, pemphigus, variola). (5) Suppuration in the connective tissue of the derma results from the breaking apart of the newly formed medullary elements, which, being suspended in an albuminous or fibrinous exudation, now represent pus corpuscles. Pus is a product of the inflamed connective tissue itself, and is always a result of the destruction of that tissue. Suppuration of the derma invariably heals through cicatrisation (abscess, furuncle, acne, ecthyma, variola). (*The Boston Med. and Surg. Journ.*, Dec. 4, 1879.)

Ammonia in the Treatment of Rheumatic Arthritis.—Prof. Wasylewski has employed ammonia in the treatment of rheumatic arthritis for the last two years in the Lazarus Hospital at Krakau. Seventy-seven patients presented themselves for treatment during this period; and of these, sixty-three were treated with ammonia, receiving daily six drops of the following:—Muc. gum. Arab., syrup. cort. aurant. aā 20·0, Ammon. pur. liq. recent. gtt. vij.; or Aq. fœnicul. 70·0, syr. simpl. 10·0, Am. pur. liq. rec. gtt. vj. A coffee-spoonful every two hours. The latter mixture has the better taste, and will consequently be the more willingly taken. Of the sixty-three cases treated with ammonia, thirty-four were complicated with fever, which lasted on the average seven days. The highest temperature registered was 40·5° C. The duration of the disease in these patients was 31·32 days, whilst in those who had no fever it was 20·70 days. Four patients were dismissed at their own request uncured, after they had been treated with ammonia, salicylic acid, potassium iodide, and baths. One patient died during convalescence from acute tuberculosis. (*Przeglad. lekarski*, 1879; *Med.-chir. Rundschau*, Nov. 1879.)

On the Action of the Coffee Alkaloid.—Caffein in small doses was shown by Binz and Peretti, in 1875, to exert no influence upon the temperature. In large doses, which were insufficient to produce convulsions, the body temperature was raised 0·6° C., whilst still greater quantities caused salivation, muscular stiffness, &c.; and increased the temperature in the course of one or two hours to 1-1·5° C. This increase of temperature lasted for several hours, after which there was a fall to below the normal. This action of caffein upon the body temperature was prevented by artificial respiration. Caffein acts as a remarkable excitant in cases of alcohol narcosis, for in every case the slow respiration rate of the patient was raised, sometimes within fifty seconds, after the administration of the caffein. In intoxicated animals caffein in moderate doses increased the blood-pressure and pulse

rate, even after section of the vagi. Binz has shown that this stimulating action of caffein is not due to the potash salts which it contains, since these salts, when administered *per se*, were found to be ineffectual. After injection of an infusion of coffee, or after its subcutaneous injection, the pulse and respiration rate increased, whilst there was a marked fall in the blood-pressure. (*Arch. f. exp. Pathol. u. Pharmakol.*, vol. xx. p. 31; *Centralbl. f. Chirurgie*, Oct. 25, 1879.)

Albuminuria without Disease of the Kidney.—In three anæmic but otherwise healthy men, Edlefson observed transitory albuminuria after severe bodily exertion. Leube has met with a relatively large number of such cases in soldiers, and he has sought to account for the albuminuria by the theory that muscular exertion causes an increased infiltration of albumin into the glomeruli. Edlefson, however, does not accept this theory, but offers the following explanation of the phenomenon. In healthy men, according to Ranke, the muscles, when in active exertion, contain an increased quantity of blood, while at the same time the organs that are at rest contain a correspondingly smaller supply of blood. This difference in the blood-supply of the temporarily inactive organs must be still greater in anæmic persons, since the weakened muscular tissue of the heart is unable in response to the increased demands made on it during bodily exertion, to force a sufficient supply of blood into the aorta, the result being that the internal organs receive still less blood than they would in a state of health; moreover, the blood, for the same reason, accumulates in the pulmonary and venous systems. Now, Runeberg found, after numerous experiments, that in the filtration of albuminous solutions through animal membranes, contrary to the formerly received opinions, the readiness with which the albumin passes into the filtrate increases in an inverse ratio to the diminution of the pressure exerted, or when the filtration takes place into a fluid surrounding the filter, in a direct ratio to the increase of the pressure excited from below, and from the sides against the filtering membrane. Applying these facts to the phenomenon in question, Edlefsen argues that albumin which cannot pass through the vascular membrane of the glomeruli Malpighii under the normal condition of pressure, can pass through it when the pressure is diminished by bodily exertion. This is more especially the case when the person is anæmic, because then the simultaneously over-filled veins increase by pressure on the urinary tubules, and the fluid contained in them, the counter pressure on the vascular membrane of the glomeruli, and thereby lessen the difference between the direct and the counter pressure on the membrane. (*Berliner klin. Wochenschr.*, Sept. 22, 1879; *The New York Med. Record*, Jan, 3, 1880.)

Bromide of Ethyl as an Anæsthetic.—From a number of experiments made with this substance, which was first used by Mr. Nunneley, of Leeds, Dr. Levis, of Philadelphia, is inclined to recommend its use as anæsthetic. Its action is rapid, and the patient quickly recovers from its effects. The author does not think it influences the circulation, except by slightly increasing the quickness of the heart's action and the arterial tension. The cerebral anæmia and fatal syncope liable to be caused by chloroform do not seem to threaten in the anæsthesia produced by the new agent. Respiration is little influenced by it, and nausea and vomiting appear to occur less frequently than from ether or chloroform. The odour of bromide of ethyl remains a longer time in the breath of the patient than ether or chloroform; it does not irritate the respiratory passages; general excitement and a tendency to struggle occur less frequently than in the earlier stages of ether or even chloroform anæsthesia. Anæsthesia is usually effected in from two to three minutes. The quantity required varies with the method of using it. The way the author recommends is to put two drachms of the bromide of ethyl on a small napkin folded up into a space about four inches square, and then laid on a large napkin folded so as to be large enough to cover the face of the patient. It is well to secure the two napkins together with a pin. The vapour of bromide of ethyl is not inflammable, and it is therefore free from one of the risks which attend the use of ether. (*Philadelphia Med. Times*, Jan. 17 and Feb. 14.)

Antiseptic Treatment of Suppuration of the Middle Ear.—For this purpose Bezold recommends the use of finely powdered boracic acid. The meatus and tympanum are first cleansed carefully with a four per cent. solution of the acid, then dried thoroughly, and finely pulverised boracic acid blown in over the suppurating surface; the meatus is then closed with salicylic, carbolic, or boracic cotton. (*American Journal of Otology*, Oct. 1879.)

Notes and Queries.

Professor Hughes' Audiometer.—The audiometer is an instrument for exactly measuring the power of hearing, and chronicling the progress of recovery from deafness. It was invented by Professor Hughes, and is manufactured by Messrs. Krohne and Sesemann. It was first applied by Dr. Richardson, F.R.S., to some investigations relating to hearing. He says :—"The instrument will be of great use to the physician in determining the value of hearing in those who are deaf, and in determining the relative values of the two organs of hearing. In one instance, already, I have been able by its means to detect in a person who was supposed to be equally deaf on both sides that on one side the hearing is perfect close up to zero, while on the other side nine-tenths of the hearing is lost. The instrument may be used to differentiate between deafness through the external ear and deafness from closure of the Eustachian tube —throat deafness—or to determine the value of artificial tympanums in instances of deafness due to imperfection or destruction of the natural tympanum." The apparatus consists of two Leclanche's cells, *d d*. These are connected with two primary coils, *b b*, of which one is fixed at each end of bar *a*. In the circuit is inserted Professor Hughes' microphone key, *c*, by which the current is made or broken. By means of a swivel, *g*, either the force of one or, when desired, two cells can be made to act, the stronger current being used only for very deaf patients. Between the two primary coils, *b b*, is placed a secondary or moving coil, *e*, which is connected with two binding screws with the telephone, *h*. The whole is mounted in a mahogany case, the connections are all made, and the cells are charged with the excitant (sal-ammoniac) in crystals. When sent abroad, the recipient has only to draw each cell a little forward, without undoing the connections, and to fill them half full with water. In a few minutes sufficient of the salt has been dissolved and the apparatus is ready for use, and remains so unchanged for years. The bar, *a*, is made either of ivory, vulcanite, or boxwood, and is graduated from the left coil

downwards towards the right coil into two hundred millimetres. The sound, transmitted through the telephone when short taps are made on the microphone key, is loudest when the moving coil is nearest the left hand primary coil, and gradually and regularly diminishes and becomes less and less audible as the coil is moved towards the lowest part of the scale. At 0 (zero) there is absolute silence or no sound. Not only is it an absolute zero as regards our own hearing, but a theoretical absolute

zero where theory shows no sound can exist. The scale is read at the left side from the moving coil. After this coil has passed 0, a sound is again audible. When examining a patient, it is advisable not to let him or her see the movements or tappings on the microphone key, also to change the character of such tappings. The examinations must be carried out in a perfectly still room, free from external noises. The patient should be directed to listen very attentively to the gradually diminishing sound. The telephone may be held either against or near the ear, as the operator may wish.

CONDY'S OZONIZED SEA-SALT.—This is recommended by the inventor as an addition to ordinary baths. We have tried it, according to the directions, and find that the bath to which this salt has been added has an effect much more stimulating and invigorating than one of simple fresh water.

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*** Any of the foreign works may be procured on application to Messrs. Dulau, of Soho Square, W.C.; Williams and Norgate, of Henrietta Street, Covent Garden, W.C.; or Ballière, of King William Street, Charing Cross.

Department of Public Health.

ON AN OUTBREAK OF FEVER THAT PROVED TO BE TRICHINOSIS ON BOARD A REFORMATORY SCHOOL SHIP.

BY MR. W. H. POWER,

Of the Medical Department of the Local Government Board.

THE inquiry of which the results are given in the following report was directed by the Local Government Board at the request of Mr. Secretary Cross, to whom application had been made, 30th October, 1879, by the School Ship Society for investigation of an alleged outbreak of "fever" on board their ship *Cornwall.*

This outbreak, it was stated, had occurred about a month before, and was the second prevalence of "fever" on board within a period of four years. At the end of 1875, indeed, nearly 50 per cent. of the boys had been affected with what was held to be enteric fever. In regard of this outbreak, and also at the request of Mr. Secretary Cross, an inquiry was in March, 1877, ordered by the Local Government Board. It was to have reference to the sanitary condition of the *Cornwall,* and to a suggestion that the health of the boys had suffered from the outflows of metropolitan sewage at Crossness and Barking. Mr. Netten Radcliffe conducted this inquiry, but, for various reasons, was unable to complete it. A memorandum by him presented to the Board on the subject is dated May, 1878.

The *Cornwall* lies at moorings in the Thames off Purfleet. Formerly, as an 80-gun ship, her complement consisted of 800 officers and men. As a reformatory school ship she has at no time accommodated more than 318, boys and officers. At the date of the recent outbreak the numbers were 262 boys and 15 officers. The age of the boys ranged from 12 to 20 years.

The Outbreak of 1879.—Up to mid-September the health of the boys had during a long period been satisfactory. For many weeks no boy, except one accredited with incipient phthisis, had been more than a very few days on the sick list, and the entries appearing on this list referred only to minor ailments and to casualties. On *Tuesday*, 23rd September, seven boys reported themselves to the medical officer of the ship for the sick list, and were admitted to the sick-bay. Setting aside one trivial case, six boys suffered thenceforward from an illness that lasted 18 days in a fatal case, and 26, 37, 38, 42, and 88 days in cases that recovered. Next day, 24th September, two boys reported themselves to the doctor; one of them was only slightly ill for a few days, the other was confined to bed 28 days. By the 29th September, 10 other boys had come on the sick list. Except one who had symptoms of pneumonia, and was ill 38 days, none had marked objective symptoms, and all of them seemed well in a few days. On *Tuesday*, 30th September, and *Wednesday*, 1st October, six boys came under treatment. Three of them had illness lasting 18, 18, and 29 days; the ailments of the others appeared trivial. Between 3rd and 6th October nine boys, and on 11th October one boy came under the doctor. All, except one who suffered several weeks from jaundice, were out of sorts a few days only. From *Tuesday*, 14th, to Thursday, 17th October, six boys came under treatment; five of them were ill for 18, 18, 31, 35, and 67 days respectively; one only proved a trivial case. On Tuesday, 21st October, one boy, and on 23rd October another boy, came under treatment. The former was ill 14 days, the latter had no decided symptoms. This was the last case up to the time of the inquiry. In all, therefore, there were 43 cases of some sort or degree of sickness. They may conveniently be divided into the more serious and the less serious attacks. In all 18 boys suffered from decided, most of them from serious, illness, and one of them died on the 18th day of his disease. Twenty-five other boys were slightly ill, most of them for a few days only; and some of these 25 may not, it was thought, have been ill at all, but owing to panic may have imagined themselves possessed of symptoms of the sort described by boys who really suffered. There can be no doubt that all the serious cases, and some of the slighter ones

as well, had a disease which was properly described as a "continued fever." In most instances the symptoms were clearly indicative of enteric disturbance, and in some cases there were in addition persistent diarrhœa, rose-coloured spots on the abdomen, and hæmorrhage to a greater or less extent from the bowels. From these data the outbreak was regarded as one of enteric fever, presenting perhaps an unusual number of abortive cases, and as possibly complicated by malingering.

On occurrence of the outbreak prompt measures were taken for isolation of the boys attacked. In the absence of any proper hospital accommodation in connection with the ship, the boat-house at Purfleet, belonging to the vessel and situated on the jetty by which access is gained thereto, was at once cleared of its contents and prepared for reception of the sick. By 26th September it was fitted as a temporary hospital, and on that day seven cases were transferred to it. Subsequently, cases as they arose, whether severe or trivial, were removed to this boat-house. On 1st October, arrangements having been made for their reception, 10 boys were removed to the Seamen's Hospital, Greenwich, and on 6th October another batch of four boys. With the single exception of a case of jaundice, none of the boys removed to Greenwich had any notable illness; consequently 13 of the 14 were returned to the *Cornwall* after a week or 10 days each in hospital. During the progress of the outbreak a plot of ground at Wennington, 1½ mile from the ship, was acquired by the School Ship Society for hospital purposes, and hereon was erected an iron building to which were removed, 7th November, all patients from the boat-house capable of bearing the journey. On 11th November, the occasion of my first visit to the *Cornwall*, one boy only remained in the boat-house. This boy had then been ill 50 days, and presented, on such examination as was bearable by him under the circumstances, conditions usual to persons who have suffered many weeks from fever.

This was the history as presented to me at the beginning of my inquiry; and I at once set myself to search for causes of enteric fever.

In seeking for such causes regard was had to circumstances

of a kind that experience has suggested might be concerned with enteric fever, and that may have affected (*a*) the ship's company collectively, or (*b*) particular boys, or groups of boys, and through them, perhaps, other persons. It was seen that if such circumstances failed to explain the occurrence of the disease, inquiry would have to be directed into the influence of articles of food hitherto not recognised as capable of producing enteric fever.

I. *a.* Under the first head the evidence obtained proved negative. *Water* could be excluded for the reason that the water consumed on board was from the Purfleet reservoir of the South Essex Water Company, within the area of which service no prevalence of enteric fever was heard of. Such risk of contamination of this water as was formerly incurred during transit to the ship has been got rid of, since the outbreak of 1875, by establishing, by means of a hose attached to a chain cable, direct communication between the mains of the water company and the water tanks on board: to this new method of water conveyance no suspicion attached. *Milk* as an agent of infection was altogether out of question. None of the boys on board under any circumstances partook of milk. *Sanitary Circumstances of the Ship.*—Herein nothing was discoverable suggestive of conditions likely to favour recrudescence of the disease of 1875, or to foster recently imported infection. Most of the structural and other alterations recommended after the last outbreak by the Port Medical Officer had been long since adopted, and the ship throughout appeared to be clean, well ventilated, and wholesome. Notably the arrangements and regulations respecting excrement disposal were, especially as regards the boys, of such sort as to render highly improbable any fostering or dissemination of infection of excremental outcome. It it true that two officers' closets on the main deck forward (which have been retained notwithstanding the Port Medical Officer's recommendation for their removal) are from their proximity to the sick-bay objectionable; but no evidence was forthcoming suggestive of their having had concern with the outbreak. *River Circumstances.*—In regard of possible influence of river-borne sewage, bathing and swimming of the ship's company in the river, and washing of decks with river

SUCCESSION OF "FEVER" CASES ON THE "CORNWALL." [Severer

The intervals of the Table

Date of going on Sick List.	Name and Age.	Date of Removal from Ship.	Duration of Illness to Convalescence.
September 23	Harry Sims, 15 . .	September 26 . .	38 days .
,, 23	Henry Wheeler, 16 .	September 26 . .	37 ,, .
,, 23	Joseph Bradshaw, 16 .	September 26 . .	38 ,, .
,, 23	Arthur Brawnis, 16 .	September 26 . .	26 ,, .
,, 23	Charles Beaumont, 15 .	September 25 . .	42 ,, .
,, 23	Richard Pierce, 16 . .	September 26 . .	18 ,, died
,, 23	*Alfred Tuck*, 16 . .	*October* 1 . . .	10 ? ,, .
,, 24	Edward Davis, 16 . .	September 26 . .	28 ,, .
,, 24	*Henry Dashwood*, 16 .	*October* 1 . . .	8 ? ,, .
,, 26	*George Brace*, 16 . .	*October* 1 . . .	5 ? ,, .
,, 27	*George Muir*, 15 . .	*October* 3 . . .	6 ? ,, .
,, 28	Arthur Marks, 16 . .	On board throughout	38 ,, .
,, 28	*James Austen*, 16 . .	*October* 1 . . .	? .
,, 29	*Alfred Jardine*, 15 . .	*October* 1 . . .	? .
,, 29	*Alfred Mortby*, 14 . .	*October* 1 . . .	? .
,, 29	*Edward Dowsett*, 15 .	*October* 1 . . .	? .
,, 29	*John Louder*, 13 . .	*October* 1 . . .	? .
,, 29	*Joseph Childs*, 16 . .	*October* 1 . . .	? .
,, 29	*Henry Rose*, 15 . .	*October* 1 . . .	? .
,, 30	*William O'Hara*, 16 .	*September* 30 . .	*days* ? .
,, 30	*George Saunders*, 15 .	*October* 1 . . .	? .
,, 30	*James Kiff*, 16 . .	*September* 30 . .	? .
October 1 .	Henry Salmon, 16 . .	October 3 . .	18 days .
,, 1 .	Charles Speer, 17 . .	October 2 . .	18 ,, .
,, 1 .	William Putt, 15 . .	October 2 . .	29 ,, .
,, 3 .	*George Lawrence*, 15 .	*October* 3 . . .	? .
,, 3 .	*W. Spice*, 15 . . .	*October* 3 . . .	? .
,, 3 .	*J. Mitchell*, 15 . .	*October* 3 . . .	? .
,, 5 .	*George Newman*, 17 .	*October* 5 . . .	? .
,, 5 .	*Alfred Lays*, 15 . .	*October* 9 . . .	? .
,, 6 .	Frederick Simmonds, 16	October 6 . .	38 days .
,, 6 .	*William Mosely*, 16 .	*October* 16 . .	? .
,, 6 .	*Albert Ferris*, 16 . .	*October* 16 . .	? .
,, 6 .	*Daniel Holland*, 15 .	*October* 15 . .	? .
,, 11 .	*Henry Rogers*, 14 . .	*October* 11 . .	8 *days* .
,, 14 .	Edwin Brice, 16 . .	October 15 . .	31 ,, .
,, 14 .	James Howes, 14 . .	October 15 . .	35 ,, .
,, 14 .	Henry Weare, 15 . .	October 14 . .	67 ,, .
,, 16 .	*William Brooks*, 14 .	*October* 16 . .	? .
,, 17 .	Frank Bowler, 15 . .	October 17 . .	18 days .
,, 17 .	James Hopcroft, 15 .	October 19 . .	18 ,, .
,, 21 .	George May, 15 . .	October 21 . .	14 days .
,, 23 .	*Frederick Ringrose*, 14 .	*October* 24 . .	8 ,, .

cases in Roman type; slight or doubtful cases in *italics.*]

show Monday nights.

Watch.	Mess.	Division.	Position of Sleeping-berth.	Last on Leave before Outbreak.
Starboard	15	13th	Lower deck, right forward . . .	No leave.
Port .	17	16th	,, ,, abaft main hatch . .	,,
Port	3	4th	Middle ,, abreast main hatch . .	,,
Starboard	15	11th	Main ,, forward, ship's side . .	,,
Starboard	15	5th	Lower ,, abaft main hatch .	July 22-25.
Starboard	15	13th	,, ,, right forward . . .	No leave.
Port .	17	*12th*	*Lower* ,, *forward, ship's side* .	*August* 2.
Port .	3	4th	Middle ,, abreast main hatch . .	Sep. 26, 1878.
Port .	6	*10th*	*Lower* ,, *abreast hatch, forward* .	*April* 12.
Starboard	6	*9th*	,, ,, *opposite magazine hatch* .	*May* 27.
Port .	5	*6th*	*Middle* ,, *abreast fore-ladder* . .	*April* 10.
Starboard	19	17th	Lower ,, abaft main hatch . .	Dec. 27, 1878.
Starboard	3	*3rd*	*Middle* ,, *abreast model* . . .	*No leave.*
Starboard	9	*9th*	*Lower* ,, ,, *hatch forward* .	*June* 30.
Port .	9	*12th*	,, ,, *forward*	*June* 8.
Port .	6	*10th*	,, ,, *abreast hatch forward* .	*April* 26.
Port .	10	*14th*	,, ,, *amidship* . . .	*May* 6.
Starboard	10	*7th*	,, ,, *opposite main hatch* . .	*No leave.*
Port .	5	*4th*	*Middle* ,, ,, ,, ,, . .	*May* 18.
Port .	3	*4th*	,, ,, ,, ,, ,, . .	*August* 28.
Port .	19	*18th*	*Lower* ,, *abaft cabins* . . .	*No leave.*
Port .	8	*10th*	,, ,, *opposite magazine* . .	,,
Port .	11	8th	,, ,, opposite main hatch .	Sep. 14-18.
Port .	4	4th	Middle ,, ,, ,, ,, . .	,, 7-11.
Starboard	15	9th	Lower ,, ,, magazine hatch .	April 16.
Starboard	8	*5th*	,, ,, *abreast main hatch* . .	*No leave.*
Port .	20	*18th*	,, ,, *abaft cabins* . . .	,,
Port .	20	*18th*	,, ,, ,, ,, . . .	,,
Starboard	5	*1st*	*Middle* ,, *abaft*	*June* 8.
Port .	20	*18th*	*Lower* ,, *abaft cabins* . . .	*No leave.*
Starboard	5	5th	,, ,, opposite main hatch .	May 28.
Starboard	1	*1st*	*Middle* ,, *abaft cabins* . . .	*July* 3.
Port .	1	*2nd*	,, ,, ,, ,, . . .	*May* 31.
Port .	11	*12th*	*Lower* ,, *forward*	*April* 19.
Port .	4	*8th*	,, ,, *abreast officer's cabins* .	*May* 23.
Port .	3	10th	,, ,, opposite magazine hatch .	May 31.
Starboard	17	15th	,, ,, under main hatch . .	July 4-9.
Starboard	9	9th	,, ,, opposite magazine hatch .	May 30.
Starboard	12	*1st*	*Middle* ,, *abaft*	*July* 25.
Port .	8	16th	Lower ,, under main hatch . .	No leave
Port .	19	18th	,, ,, abaft	,,
Port .	17	12th	,, ,, forward	August 4-6.
Starboard	7	*7th*	,, ,, *opposite main hatch* . .	*No leave.*

water, received attention. As to bathing, all hands bathed for the last time for the season on the 15th August. Only boys learning to swim, some 24 in number, continued their lessons until the 8th September. Bathing seemed to be excluded as a factor in the outbreak from the circumstance that the interval between the occasion of the last bathing and the date of the outbreak, a period of upwards of five weeks, far exceeded any known limit of the incubation period of enteric fever. On the other hand, swimming, though not thus excluded, was set aside from the fact that one only of the 24 boys learning to swim was included in the first group of sufferers by the outbreak. Washing, or rather sluicing, of decks with river water could not, as a possible cause of the outbreak, be excluded: but, on the other hand, there was nothing whatever to show that it had, in fact, any influence for harm. And so with any emanations there may have been from the river itself, or from the foreshore.

I. *b*. The second stage of inquiry, having to do with the circumstances of particular individuals and groups of individuals, required, beside other information more or less easily attainable, minute and accurate knowledge of the inner life on board the vessel. Thus it came about that I attempted to live over again, as it were, on shipboard the weeks preceding the outbreak. In doing this I was assisted, in a way and to an extent which I cannot describe, by the Captain Superintendent, who throughout a tedious inquiry rendered me unwearied assistance. By this method a mass of evidence concerning the boys was got together. It had to do with boys who escaped as well as with boys attacked, and much of it, as was inevitable, proved in the end irrelevant. Before proceeding to deal with the matters investigated, it will be convenient to state in a tabular form, for future reference, some of the data obtained in regard of the boys attacked. (*See Table*.)

The boys on board the *Cornwall* are divided primarily into two watches, port and starboard, of equal strength; and are also classed in messes, which are 20 in number in all. A third sort of grouping of the boys, in 18 "divisions," has reference to seniority and to sleeping quarters. The watches, each on alternate days, are employed on the work of the ship, seamanship-instruction, &c.; the watch not on duty being at school. On

one afternoon in each week, Wednesday, all hands go ashore for recreation; cricket, football, and the like. The messes, each numbering 12 or 13 boys, have reference only to meals, and all meals are taken on the middle deck. Except at meal times, boys of the same mess do not necessarily associate together. The sleeping berths, which are allotted without reference either to watches or messes, are with few exceptions on the middle and lower decks. Inmates of the sick-bay and wet-a-beds alone sleep on the main deck.

Data of the sort furnished by the table were studied with reference to the domestic life on board the ship here glanced at, but they did not for a length of time afford any clue to the outbreak. Of the many directions in which inquiry was pushed without result, some of the chief are as follows:—

Nothing could be discovered leading to suspicion that any groups, large or small, of boys could have been infected while *on shore* for amusement or exercise; and, beyond a somewhat heavy incidence of the early outbreak on a particular mess (an incidence that could not, it was thought, be usefully considered until other questions had been exhausted), no sort of grouping led to any suggestion about the origin of the disease *on the ship*.

Importation of infection to the ship by any individual boy seemed to be excluded. None of the boys early or severely attacked had been from the ship for many weeks previous to the outbreak. As regards new comers, in July seven, in August four, and in September two boys were admitted to the ship. One only of these 13 came under the doctor within two weeks of admission. He had slight diarrhœa on July 7th, 8th, and 9th. Short "leave" to boys who have been six months on board is often accorded, but only on written assurance by the friends to whom the visit is to be paid that their households are free from sickness. In the 12 weeks ending 23rd September 78 boys had leave, in no case exceeding five days. One only of the 78 came on the sick list within two weeks of his return. He suffered from "stomach derangement and debility" on July 24th, 25th, and 26th, after which he returned to duty.

Importation of infection by visitors was considered. Visitors to the ship, notably "old boys," are very numerous. In the month of August alone, 42 old boys (14 of them on one day,

21st August) visited the ship. Old boys and other male visitors use (if they require to do so) the closets in the "heads"; females use the private closets. It has been already noted that spread of infection by means of the closets on board appeared altogether unlikely. Inquiry is made of all visitors to the boys as to infection at their homes before they are received on board.

In the laundry arrangements no suggestion as regards importation or dissemination of the disease was afforded. All clothing of the boys is washed on board, in water from the domestic supply, on Mondays and Thursdays, and each boy does his own washing. Clothes and bed linen of sick cases were during the outbreak disinfected at the boat-house and then taken to Purfleet to be washed.

Particulars respecting the dates of reception on board of new clothing and bedding, and the distribution of such articles to boys individually or in groups, afforded no clue to the outbreak.

II. It was not until the foregoing lines of inquiry had been exhausted that inquiry as to possible influence of food in producing the outbreak could be usefully made. For we have no knowledge of dissemination of enteric fever by constituents of food other than water and milk. In connection, however, with the question of food of the boys, certain circumstances that had throughout the inquiry been borne in mind began to attain prominence. These were, the fact that the food supplied to and cooked for the boys was distinct and separate in all respects from that of the officers, who escaped illness; that the incidence of the first outburst of disease had been exceptionally on mess 15; and that the more serious cases arranged themselves in groups which were attacked mainly on *Tuesdays* or *Wednesdays* at weekly or fortnightly intervals. Thus in seeking among articles of food for an unrecognised agent in the propagation of enteric fever, there existed no *primâ facie* ground for suspecting one kind of food more than another, unless one could be found capable of fulfilling certain assumed conditions of the problem requiring solution. These conditions were, that the article of food should have come into use about the time of the outbreak; that it should have been consumed by the boys alone, and chiefly in the first instance by boys of a particular mess or

messes; and that it should have had opportunity of operating weekly for two successive weeks and then only after the lapse of a fortnight. Considerable hesitation was felt as to the validity of the conditions assumed as requiring fulfilment. For the heavier incidence of the outburst on mess 15 was not so decided as to be beyond the range of mere chance, and the assumption of operation of the cause of the outbreak on certain Tuesdays was based on one class of cases only, the graver ones, as probably being in their incubation more constant than the others. Obviously, too, all articles of food provided solely for the boys would equally fall under suspicion, if the fact of boys alone being attacked were exclusively considered. But notwithstanding objection to seeking hypothesis to fit hypothesis, investigation in the above sense was undertaken, for the reason that unless this was done inquiry could not proceed further.

Exceptional food of the boys first received attention, and herein was found a circumstance that seemed of possible significance. Pierce, the boy who died, received, as boys were in the habit of doing, a present of food from home, shortly before his illness. This food consisted, it was thought, of cake alone which he probably shared with his mess (No. 15), and other comrades. By this means might have been brought about (if the cake was infective) some of the earlier features of the outbreak; though all the conditions of the problem would not thus be satisfied. The question was therefore left for, if necessary, future consideration.[1] Inquiry respecting the regular diet of the boys extended to all articles of food used on board, the days of the week on which they were habitually consumed, and the dates on which articles of food other than fresh meat and vegetables (which were received day by day) were received on board. As regards meals, breakfast and supper offered no hint as to the cause of the outbreak. Neither meal varied in any way suggestive of relation with the grouping of cases observed in the outbreak. Dinner, however, seemed to suggest a clue. The animal food of the boys, though varied day by day (fresh

[1] Towards the close of this inquiry, and after the above was written, the Captain Superintendent ascertained that Pierce's present comprised, besides cake, in all probability animal food. Further consideration of the subject which thus became necessary will be given later on.

meat four times a week, and cheese, suet pudding, and salt meat each once), was the same every Sunday, every Tuesday, every Wednesday, every Thursday, every Friday, and every Saturday; but on *Mondays* could vary. Monday was, indeed, always a boiled *salt meat day;* but the *sort* of salt meat consumed on Mondays differed from week to week. As a rule it was alternately salt beef and salt pork; now and then it happened that either one or the other constituted dinner on *successive* Mondays; and occasionally a dinner of the one was supplemented to some extent by the other. Salt beef, therefore, and salt pork came under suspicion, for either of them might by this method of consumption have been related to the grouping of the graver cases on or about certain Tuesdays; and further, it was ascertained that a fresh cask of each came into use shortly before the outbreak. Suspicion of this sort once aroused settled naturally on pork. Not indeed on account of so-called typhoid fever of the pig (which is not known to be transferable to man), but for a wholly different reason. It occurred to me that if pork had had to do with the outbreak, some of that (224 lbs.) of the cask newly taken into use *might have been trichinised, and that the disease, therefore, from which the boys suffered might not have been enteric fever at all, but trichinosis.* It will be observed that a theory of trichinosis seemed exactly to fit the conditions assumed as requiring fulfilment. A newly broached cask of pork came into use shortly before the occurrence of the outbreak. The pork was consumed by the boys alone. Portions of the pork not thoroughly well cooked might form but a small proportion of a total dinner for the boys, and might therefore have been consumed on particular days within the limits of one or two messes, and thus (if such portions happened to be infected with trichina) the incidence of the severer cases on a particular mess or messes might have been brought about. Again, pork might very well have been consumed on two successive Mondays, and after that not until a fourth Monday, and thus the specialities of the time-distribution of cases, notably the peculiar grouping of the graver attacks, might be accounted for; while the great diversity of duration of illness would be quite intelligible. Trichinosis, in its incubation period, and in the duration of the illness resulting from it, has been

known in outbreaks of the disease upon the Continent to vary very greatly. Probably the persons who have eaten most largely of trichinised flesh, or who have eaten it in a condition most nearly approaching a raw state, suffer soonest (sometimes within 24 hours) and most severely from trichinous disease. Many persons who have certainly partaken of trichinised flesh, but who have done so sparingly, or in a fairly cooked state, have escaped the disease altogether, or have had merely trifling illness of undefined commencement and end, and occurring many days, even some weeks, after the infective meal. Other evidence, too, seemed to support the theory. It was now ascertained that the use of pork on board the *Cornwall* had, owing to misgiving as to the wholesomeness of such food, been discontinued shortly before the cessation of the outbreak; further, it was learned that the pork in question was "American pork," exceptionally obtained from a firm in Bristol; and more, that it consisted solely of "belly pieces," and therefore of parts of many pigs, and of those parts most likely to be infested with trichina.

The theory of trichinosis was accordingly put to the test of further inquiry; but no confirmation of it was at first to be found. Inquiry (1) respecting the actual consumption on particular Mondays of the pork in question, (2) the pathological condition of that pork, and (3) the clinical records of the cases attacked by illness failed, for various reasons, in attaining any other than a negative result. (1) As to pork, the cook's books, though showing day by day the consumption in kind and in amount of each article of food used by the boys, failed to distinguish between salt beef and salt pork. These were habitually classed together as "salt meat," 96 lbs. of which were entered as having been consumed each Monday in September and October. Thus the precise Mondays in these months on which pork had been consumed, and that Monday in October on which it had been last eaten, could not be determined, Again, (2) microscopical examination of small portions, in each instance, of pieces of pork remaining in the "harness cask,"[1]

[1] The "harness cask" is that containing brine, into which odd portions of the salt meat taken from the original casks await consumption. The amount of meat that finds its way into the harness cask probably varies a good deal.

and believed on board to have formed part of the contents of the cask that had come into question, failed to find any trichinæ. (3) Detailed examination of the clinical records of the cases of illness failed in like manner to establish or to refute the theory. Few notes, except those relating to temperature, pulse, and respiration, had, owing to stress of work during the outbreak, been taken, and these by themselves afforded no ground for a conclusion. The temperature curves (when I had formulated the notes in charts) showed that beyond doubt many of the boys had suffered from continued fever; but as to the precise nature of that fever, they gave no definite information. In several instances, and notably in their inception, these curves differed considerably from the temperature curves of enteric fever; but how far they (or any of them) corresponded with the temperature curves of fever resulting from trichinosis, I had no sufficient means of judging. The pulse records of the cases did not in their relation to the temperature curves appear altogether suggestive of enteric fever.

(*To be continued.*)

THE PRACTITIONER.

JUNE, 1880.

Original Communications.

CITRATE OF CAFFEIN AS A DIURETIC.

BY D. J. LEECH, M.D., M.R.C.P.,[1]

Physician to the Manchester Infirmary.

(*Continued from page* 253.)

IN acute and subacute Bright's disease, diuresis commonly takes place during recovery apart from all medication; when therefore the exhibition of a diuretic is followed by an increase in the urine excreted it is not always easy to say whether the increase is caused by the drug or simply coincident with its ingestion.

I have not cared to administer caffein in an early stage of acute kidney trouble, lest perchance it might do harm, but in some cases which have resisted ordinary treatment the drug has been given, and has appeared at times to initiate an increased secretion of urine. I only possess complete observations as to the effect of caffein in three cases of the kind. In two of these a change in the amount of urine voided followed immediately on

[1] The name of the author was unfortunately omitted at the beginning of his paper in the April number.

the exhibition of the caffein; in the third it seemed to produce no effect.

Case VIII.—J. M., aged 40, was admitted into the Manchester Workhouse Hospital on the 4th of September, 1879, suffering from general œdema, slight ascites, and bronchitis. Though habitually exposed to cold, and wet, and hardships, he had enjoyed good health until about three weeks before his admission, when he felt ill and noticed swelling in his legs, which quickly spread to his body and face.

The urine at this time was scanty in quantity, turbid, and of a brownish-red colour. A bronchial attack which followed in a few days sent him into hospital, where for a fortnight he was kept in bed and treated with hydragogue purgatives and expectorants. When I saw him on the 18th of September his legs and back were œdematous, his face was puffy, and a little fluid could be detected in the abominal cavity. The urine was highly albuminous and somewhat scanty, as it had been from the time of his admission. It contained sufficient blood to give it a distinct smoky tinge, and few blood and epithelial casts could be seen in the deposit.

At my suggestion Mr. Jackson, the Resident Medical Officer in charge of the case, gave three grains of citrate of caffein every three hours, and very kindly kept a record of the amount of urine passed, from which I have drawn up the following table:

	Pints.	
Sept. 19	$1\frac{3}{4}$	
20	$1\frac{3}{4}$	
21	(?)	
22	$2\frac{1}{4}$	
23	$2\frac{1}{2}$	
24	$3\frac{1}{4}$	
25	$3\frac{1}{2}$	
26	3	
27	4	
28	$4\frac{1}{2}$	
29	$4\frac{1}{2}$	
30	5	
Oct. 1	$4\frac{1}{4}$	Caffein Citrat. gr. iij. tertiis horis.
2	(?)	
3	$4\frac{1}{2}$	
4	$4\frac{1}{4}$	
5	$4\frac{1}{2}$	
6	4	
7	$4\frac{1}{2}$	
8	4	
9	5	

	Pints.	
Oct. 10	3	
11	3	
12	4	
13	3	No medicine.
14	3	
15	$3\frac{1}{2}$	
16	$3\frac{1}{2}$	
17	4	
18	$5\frac{1}{2}$	
19	$4\frac{1}{2}$	Caffein Citrat. gr. iij. tertiis horis.
20	5	
21	5	
22	$3\frac{1}{2}$	Purged without.
23	4	No medicine.
24	(?) 5	

The increase in urine, following upon the administration of caffein, was accompanied by a marked decrease in the œdema and by the disappearance of the ascites. In a fortnight after the caffein was given very little swelling remained; in little more than a month it had quite gone, and the man felt so well that he persisted in leaving the hospital, though the urine still contained albumen and was excessive in quantity. Two months afterwards I heard of him as feeling quite well, though albumen was still present in the urine.

Not only did the amount of urine voided in this case increase at once when the caffein was given, but the average amount passed whilst caffein was taken was somewhat greater than when it was omitted; yet it is evident that the diuresis was not entirely due to the medicine, for the quantity of water passed was abnormally large without medicine. The arterial tension was high before caffein was taken, and the sphygmograph gave no evidence that the drug increased it. Only on one occasion was severe headache complained of, but it ceased at once when the medicine was suspended.

Case IX.—C. R., aged forty-four, was admitted into the infirmary on the 26th of November, 1879. Four weeks before admission she had the usual symptoms of acute parenchymatous nephritis; before this she had suffered from nothing but occasional attacks of bronchitis.

On admission the urine was scanty, contained much albumen, and deposited an abundant sediment consisting of blood or kidney epithelium—epithelial and hyaline casts and granular detritus.

She suffered from general œdema and likewise from bronchitis affecting the larger tubes.

Rest in bed and active purgation with compound jalap powder decreased the œdema somewhat, but saline diuretics did not seem to promote the flow of urine, which continued small. The daily record of twenty-four hours urine for the first fortnight of C. R.'s stay in hospital has been lost, but from the notes made by the House Physican, Mr. Marsh, I find that the urine discharged averaged about twenty-two ounces a day. From the annexed table it will be seen that a large increase in the quantity of urine passed followed immediately on the ingestion of caffein.

	Ounces.	
Dec. 10	20	No medicine.
11	30	
12	58	
13	55	
14	62	Caffein Citrat. gr. iij. ter. in die.
15	60	
16	40	Sickness and headache.
17	46	
18	38	
19	70	
20	60	
21	55	
22	—	No medicine.
23	54	
24	42	
25	80(?)	

After taking the caffein five days C. R. began to complain of great headache, and every dose caused distressing nausea, which lasted several hours. The symptoms ceased at once when the caffein medicine was replaced by coloured water, but the diuresis apparently established by the caffein continued.

When she left the hospital the œdema had disappeared, but the urine was of low specific gravity and contained albumen.

In this case as in the last, the arterial tension was high. Cardiac enlargement was not great in either J. M. or C. R.

Case X. illustrates the failure of caffein, but the dose given was smaller than in either of the other cases.

On the 9th of December, 1879, I was asked to decide as to the advisability of sending J. T. W., aged three, to the Fever Hospital. He had been brought to the Infirmary with general œdema, a slight discharge from one ear, and enlarged and painful cervical glands. As not the slightest history of scarlet fever

could be obtained, and the boy had appeared quite well until four days previously, when the œdema suddenly came on, I took him into the general wards.

The discharge from the ear ceased at once, and nothing further occurred, either to the boy or in the family from which he came, to support the suspicion that the nephritis was scarlatinal.

At first caffein was given, afterwards iodide of potassium; but though diuresis set in whilst the iodide was taken, it was probably independent of the medicine administered. It is of course difficult to estimate exactly the amount of urine passed by a child so young, but the appended table, drawn up from careful notes taken by Mr. Blore, represents with fair accuracy the amount of urinary discharge from admission to recovery. The fear of convulsive attacks which at one time seemed impending, prevented me pushing the caffein further than I did.

	Ounces.	
Dec. 11	10	
12	12	
13	10	
14	8	
15	12	
16	13	
17	9	
18	14	Caffein Citrat. gr. ½ ter. die.
19	10	
20	8	(Purged four times with compound jalap powder.)
21	9	Caffein Citrat. gr. i. ter. die.
22	8	
23	9	
24	10	
25	8	
26	9	
27	22	Potassii Iodi. gr. ij. ter. die.
28	20	
29	23	
30	12	
Jan. 1	28	
2	27	
3	—	Liq. Ferri. Percl l. ♏ v. ter. die.
4	26	
5	27	

No traces of blood could be detected in the urine after the 30th of December, and the albumen, which had gradually diminished in quantity, was only intermittingly present after the 12th of January.

The child left the hospital well at the end of the month. The nephritis probably pursued its natural course uninfluenced by the drugs given, but as marked amendment on general health accompanied the increased urinary discharge, any change in medicine immediately antecedent might readily have been credited with the improvement.

Cases VIII. and IX. by themselves would by no means afford ground for believing in the efficacy of caffein as a diuretic in acute Bright's disease, but in several other instances I have seen diuresis and amendment follow so quickly upon the administration of caffein in acute and subacute nephritis, that I can hardly doubt its utility. I have not however given it in the earliest stage, always waiting till purgatives, warm applications to the loins, &c., have been used; but comparing its apparent efficacy with the results obtained from the administration of other drugs under similar circumstances, its good effects seem to me decided; nor do I think that the continuance of diuresis after the withdrawal of the remedy militates much against the probability of its curative influence. In chronic parenchymatous nephritis I have not found caffein of service. The cases in which I have tried it have been for the most part advanced, and with a considerable amount of dropsy. It is just in these water-logged cases that we most anxiously search for a remedy to drain off the fluid by the kidneys, but it is here that caffein, like most diuretics, fails signally.

I have minute records of five cases of chronic Bright's disease in which I have given citrate of caffein a trial in varying doses. In only one was there the slightest indication of a diuretic action.

Case XI.—P. P., aged 45, was under my care from the 15th of October to the 18th of December 1879 when he died. The diagnosis of large white kidney with aortic and mitral incompetence and considerable cardiac hypertrophy made on his admission was verified at the post-mortem. The kidney mischief seemed traceable to a subacute attack of nephritis twelve months previously, but this attack might have been simply an exacerbation of a more chronic trouble.

The valvular disease was of old standing. On admission he had œdema of the legs and back, and ascites; he passed 20 to 50 ounces of urine daily (average 30 oz.); the specific gravity of

twenty-four hours urine varied from 1018—1022. Caffein was tried three times, in two, three, and four-grain doses; but not the slightest evidence of increased kidney activity followed. It caused sickness on two occasions when given in the larger doses. With this exception, it seemed to produce no recognisable effect on any of the organs. No evidence of extensive mural changes could be found in the hypertrophied heart after death.

Case XII.—W. H., aged 42, was in the Infirmary under my care for three weeks, with the usual symptoms of chronic parenchymatous nephritis. He had been ill for twelve months, and for six months his legs and body had been greatly swollen. Ascites was here a prominent symptom, and he suffered considerably from a chronic bronchitis of long standing.

Citrate of caffein in three-grain doses was tried for five days; but the urine, which was highly albuminous, got more and more scanty under its use. It produced no headache, nor did it in any way affect the circulatory or digestive organs. Copaiba, juniper, and digitalis were quite as ineffectual as caffein, and the man left the hospital unrelieved. The existence of chronic parenchymatous changes in the kidneys was verified at the man's death, which took place nearly three months after his discharge from hospital.

Case XIII.—J. S. presented symptoms very similar to those of W. H. After eighteen months of ill-health he came into hospital with general œdema and ascites, passing daily from twenty to thirty ounces of highly albuminous urine. Unlike W. H., J. S. had distinct evidence of cardiac hypertrophy. From the 8th of January to the 1st of March of 1879 he was treated with hydragogue purgatives, digitalis, and iron: during this time the daily quantity of urine passed averaged twenty-eight ounces; on one occasion only did he excrete forty ounces within twenty-four hours. At times the urine was exceedingly scanty, not amounting to more than eight or ten ounces daily.

He was twice tapped, and his legs were once punctured. Caffein for a day or two seemed slightly to increase the amount of urine passed, but after it had been taken for a few days it evidently failed utterly as a diuretic. The following table shows the

quantity of urine passed before, during, and after adminstration of caffein :—

	Ounces.	
Feb. 25	36	
26	27	Pulv. Scammonii, c.
27	24	Tr. Scille. ♏ x. } t.d.
28	28	Amm. Carb. gr. v. }
March 1	22	
2	38	
3	42	
4	34	
5	30	
6	18	
7	—	
8	17	Caffein Citrat. gr. iij. tertiis horis.
9	20	Diarrhœa.
10	17	
11	6	
12	10	
13	11	
14	18	
15	13	
16	16	Tr. Belladona, ♏ v. } ter. in die.
17	22	Spt. Amm. c. ♏ x. }
18	22	

On the 18th a sharp attack of erysipelas of the face supervened, and the man gradually sank, and died on the 25th. At the sectio the diagnosis of large white kidney made on admission into hospital was verified. If the caffein exercised any diuretic influence here, its effects were very feeble and transient.

Case XIV.—E. A., aged 22, was under my care for six weeks in the spring of 1879 with bronchitis, general œdema, and the usual indications of chronic parenchymatous nephritis. Caffein in two, three, and four-grain doses quite failed to increase the quantity of urine passed, but the larger doses caused sickness and headache.

Case XV.—A. H., aged 2, was admitted into hospital under my colleague, Dr. Simpson, in August, 1879, for chronic Bright's disease. She suffered from general anasarca, and the urinary secretion was very scanty. After many modes of treatment had been tried caffein was given in three-grain doses every three hours without any beneficial result.

Caffein thus has in my hands quite failed as a diuretic in chronic renal diseases, and though Prof. Botkin of St. Petersburg has seen it augment the kidney secretion in a case of chronic

parenchymatous nephritis with hypertrophy of the heart, there does not seem much likelihood that it will prove of service in removing the dropsy of chronic Bright's disease. Nor have I found this drug of value in dropsy dependent on cirrhosis of the liver, though my experience of its use in such cases has been small.

CASE XVI.—J. K., aged 42, was in the Infirmary for both cirrhosis and ascites. Many diuretics were tried, and amongst them caffein citrate in three-grain doses; it failed, like all other remedies, to increase in the least the amount of urine which he passed. But in addition to the liver cirrhosis the man suffered from commencing chronic renal changes both parenchymatous and interstitial.

In the next case I have to mention citrate of caffein failed to promote diuresis whilst copaiba succeeded.

CASE XVII.—R. F., aged 33, was admitted into the Manchester Infirmary on the 11th of Nov. 1878, for cirrhosis of the liver and ascites. He had been intemperate in his habits, and suffered from a venereal ailment ten years previously. The ascites had been present at least seven weeks, the superficial abdominal veins were enlarged, and the liver dulness measured only two and a half inches in the nipple line, but a distended stomach contributed not a little to decrease the area of hepatic dulness. The urine was scanty, but contained no albumen. Œdema was absent everywhere. Digitalis and juniper were first tried, then hydragogue purgatives. Subsequently copaiba and caffein were given. The comparative results of the various drugs on the urine secretion can be seen from the following tables compiled from notes taken by Mr. Maguire.

	Ounces.		
Nov. 16	26		
17	24	Tr. Digitalis, ♏ x.	ter. in die.
18	23	Spt. Junip. ʒ ss.	
19	30	Pot. Citr. gr. xv.	
20	32	Infus. Scoparii, ℥ j.	
21	25	(Girth 4½ inches.)	
22	28		
23	12	Purged freely.	
24	36		
25	42	Tr. Digitalis, ♏ x.	t.d.
26	44	Spt. Juniperi, ♏ 40.	
27	38	Pot. Citr. gr. xv.	
28	46	Infus. Scoparii, ℥ i.	
29	18	Purged freely.	
30	30	Girth 39½ in.	

In addition to the mixture occasional doses of compound jalap powder were given. On the 25th the liver could be felt for the first time below the ribs, on the 30th it could be felt plainly, and a distinct coarse friction-sound could be heard over it. Towards the end of November the slight increase in the urine flow, which seemed to be due to the digitalis and juniper, ceased; and though the same mixture was tried at intervals subsequently it never seemed to affect the kidneys. During December, the quantity of urine passed was small; it never reached above 36 ounces, and fell at times as low as 8 and 11 ounces; it averaged 24 ounces daily. In the earlier part of the month active purgation was kept up by compound scammony powder; and though the urine was so scanty, the abdominal girth still further decreased to 37 inches; but the man's general health failed considerably, so that severe purgation was inadmissible. The ascites then increased rapidly; œdema of the ankles was noticed, and perihepatic friction-sound could no longer be heard. On the 4th of January three grains of resin of copaiba were given every two hours; on the 7th the dose was doubled. The effect of the copaiba and of its replacement by caffein citrate is seen in the annexed table:—

	Ounces.	
Jan. 1	23	
2	30	
4	29	(Girth 40½ in.)
5	37	
6	44	Copaibæ, gr. iij. secundis horis.
7	50	
8	33	(Girth 41½ in.)
9	42	
10	34	(Diarrhœa.)
11	50	
12	62	
13	63	(Copaiba rash.)
14	73	
15	70	Copaibæ gr. vj. secundis horis.
16	64	
17	68	
18	52	
19	56	
20	72	
21	65	

	Ounces.	
Jan. 22	65	(Girth $37\frac{1}{2}$ in.)
23	60	
24	64	
25	60	
26	64	
27	62	
28	57	
29	61	
30	55	(Girth $36\frac{1}{2}$ in.)
31	68	Resinæ Copaibæ, gr. vj. secundis horis.
Feb. 1	58	
2	64	
3	56	
4	44	
5	40	
6	46	
7	34	
8	30	
9	28	(Girth $37\frac{1}{2}$ in.)
10	24	(No medicine.)
11	26	
12	29	
13	24	
14	34	Caffein Citrat. gr. iij. tertiis horis.
15	31	Girth 40 in.
16	32	
17	38	
18	40	Copaibæ, gr. vj. secundis horis.
19	44	
21	40	
22	48	
23	36	
24	36	
25	41	
26	44	(Girth $41\frac{1}{4}$ in.—parcabiis, 9 pints of fluid removed.)
27	54	
28	35	
March 1	46	
2	40	
3	40	
4	56	
5	55	Resinæ Copaibæ, gr. vj. secundis horis.
6	42	
7	53	
8	72	
9	66	
10	56	
11	56	
12	64	
13	63	
14	58	
15	74	
16	46	
17	62	
18	71	
19	60	
20	54	
21	68	
22	64	
23	62	Resinæ Copaibæ, gr. vj. secundis horis.
24	60	
25	72	Girth 36 in.
26	65	
27	56	
28	58	

Copaiba resin given in three-grain doses increased the amount of urine passed slightly; in six-grain doses the effect was still more marked. It brought out, too, a well-marked rash which passed away in a few days, notwithstanding the medicine was persevered with; but in about a month it seemed to lose its effect: then caffein was tried—it made the patient very sick, but did not at all increase the secretion of urine; then copaiba resin was again tried, it seemed slightly efficacious, but after the fluid in the abdominal cavity had in part been removed, and the copaiba was given in larger doses, the urine again became copious and the man improved rapidly.

On the 26th of March he ceased to take medicine, and a week later he was discharged, for the time being free from ascites.

The caffein in this case had perhaps hardly a fair trial, and it is possible that in some instances of ascites depending on cirrhosis it might be given with advantage.

(*To be continued.*)

ON CATARRHAL PNEUMONIA AND TUBERCLE IN THE HUMAN LUNG.

BY D. J. HAMILTON, M.B., F.R.C.S. ED., L.R.C.P. ED.,

Demonstrator of Pathology, University of Edinburgh, Pathologist to the Edinburgh Royal Infirmary.

(*Continued from page* 352.)

THERE was not any evidence of recent pleurisy. In looking over the *post-mortem* accounts of many similar cases of primary tubercle of the lung, I find that the records in regard to this particular vary. In certain instances there has been a little fibrinous deposit on the pleura, but, usually, it has either been absent, or has been present in comparatively small amount. A little roughening and dulness of the pleural lustre has been the utmost observed in any such case.

The pleura was beset with tubercle nodules, and when incised they could be seen to lie in its deep layer. Similar tubercle nodules were seen in immense abundance in both lungs, uniformly distributed throughout all the lobes. They had the same characters as those seen in the pleura. They were round and had a sharply defined border, which was abruptly marked off from the surrounding pulmonary parenchyma. Their colour was grey, and they had a somewhat gelatinous aspect. In size they were not so large as a millet-seed, but were nearer that of a pin's head. This is generally the case both in primary and in secondary tubercle of the lung. Bodies having an aspect similar to that of tubercle, but as large as a millet-seed, usually prove to be groups of air-vesicles in a state of catarrhal pneumonia. All the nodules were, as near as possible, of the same size. They either ran in lines along the course of a small branch of the

pulmonary artery, or they were aggregated in little clusters. The former was the commoner of the two arrangements. There was not any evidence of the nodules uniting to form larger nodules: for even although they might occasionally be seen in groups, yet the individual members of the group, after their border was once defined, never coalesced so as to constitute a single mass, and they never increased in size beyond the dimensions above stated.

The nodules, more especially in secondary tubercle of the lung, may in certain cases become united and surrounded by fibrous tissue, but even here they never fuse together, and if anything rather decrease than increase in size. The mere fact of certain tubercle-like nodules running together is strong evidence of their non-tubercular nature.

Some of the tubercles occasionally had a slight cream-yellow colour, but this was not their usual appearance, a grey connective tissue-like aspect being that which was most general. There was a total absence of blood coloration within them, and hence they stood out prominently from the highly vascular background on which they lay.

The intermediate lung tissue was vesicular, and did not readily collapse when incised. As in acute catarrhal pneumonia, some parts of it were slightly emphysematous. It was much congested, and the blood had a bright scarlet colour. The cause of the congestion in such cases, as we shall see, is the delay in the transmission of the blood through the organ, caused by the presence of the tubercles. The bright colour of the blood is due to hyper-oxygenation from the same cause. It is generally supposed that if the blood is hindered in its course through the lung it becomes of a cyanotic tint. This is manifestly erroneous, if air is freely entering the lung, for it is evident that the longer the blood is delayed in its circulation the more oxygenated will it become.

In the case which has been recorded as illustrative of primary tubercle, the commencement of the disease evidently was peritonitis following delivery. Caseation ensued in the peritonitic effusion; this softened; the caseous *débris* was absorbed, and gave rise to the formation of tubercle in various organs. The tubercles in the peritoneum were evidently of

local formation, and had their origin in the lymphatics. In the other organs, there is every reason to believe, as will be shown, that the blood-vessels were the means of transmission of the caseous products, and that the tubercle was formed within them.

The bronchial glands in primary tubercle are not always enlarged, while in secondary tubercle they invariably are much increased in size, and contain many tubercles. In primary

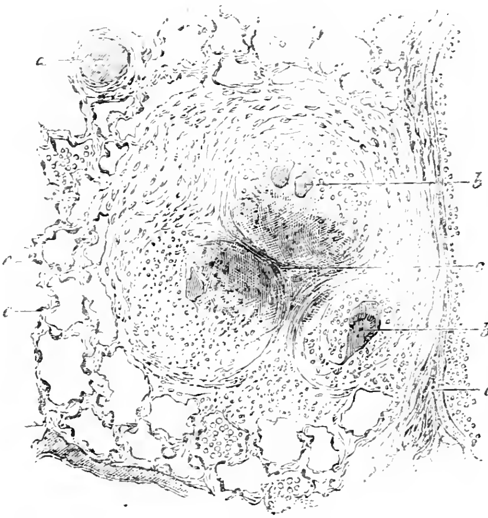

FIG. 13.—Primary tubercle of lung, two to three weeks old, × 50 diams. Source of infection was a caseous peritonitis. *a*, portion of wall of a branch of the pulmonary artery ; *b*, giant cells with concentric arrangement of fibrous tissue ; *c*, centre of tubercle beginning to caseate ; *d*, small branches of pulmonary artery seen on transverse section ; *e*, injected capillaries of the alveolar walls.

tubercle of the lung the occurrence of enlargement of the bronchial glands, from the presence within them of tubercle, is to be looked upon more as an accident than as a necessary concomitant. The cause of their enlargement in secondary tubercle will be made evident when that form of the disease is considered. It may suffice at present to state, that the fact of the presence of tubercles in the lymphatic glands in secondary, and of their occasional absence in primary tubercle of the lung, is

quite in accordance with the mode of propagation of the tubercle nodules in each.

I have given, in Fig. 13, a representation of a low power (50 diams.) view of one of the tubercle nodules taken from the above related case of primary tubercle. It can be noticed, although the nodule is not more than from two to three weeks old, that it is, even at this early date, quite distinctly defined, and that its borders are sharply marked off from the surrounding air-vesicles. The whole character of the tumour is that of an interstitial growth which is pushing the pulmonary tissue aside, and flattening the air-vesicles adjacent to it. On one side is a portion of the wall of a branch of the pulmonary artery (*a*), while small off-shoots of the same (*d*) are seen in its neighbourhood. The nodule lies close to the larger branch of the vessel.

The tubercle, as will be seen, is, in this stage, in great part cellular, with a delicate fibrous stroma running through it, while in the centre caseation (*c*) is commencing. Within the nodule several cells of large size (*b*), which are easily recognized with this magnifying power, are to be noticed. They are the giant-cells, which form so important a diagnostic feature of all tubercular growths. Even with this enlargement it is apparent that these giant-cells vary much in size and contour, and in the high power drawings given of several of them (Figs. 15, 16, and 17) these characters are more evident. Around each giant-cell or group of giant-cells a delicate concentric arrangement of fibrous tissue is apparent, so as to give rise to the impression that each giant-cell forms a nucleus for a separate tubercle or giant-cell system (Fig. 13).

All the large tubercles in this lung were totally non-vascular. The organ was injected, but in no case was the injecting fluid found to penetrate into the tubercle growths. We shall afterwards find that, from the mode of development of primary tubercle of the lung, the destruction of the blood-vessels in the part is virtually necessitated. It is for this reason that caseous degeneration ensues so quickly in the centre of the growth. The tumour being non-vascular can only be supplied with nourishment from the vessels of the lung at its periphery. Whenever, therefore, it grows to such a size that the nutritive fluids so supplied cannot reach its innermost parts, caseous necrosis ensues, and the centre

of the tubercle dies. The caseation always commences at the centre, and the cause of this is evident, the central portion being the furthest away from the nutritive supply.

By the time that the tubercle becomes an object visible to the naked eye, giant-cells can always be detected in it; and this holds good not alone for tubercle of the lung, for in tubercle of all other organs they are invariably present whenever the nodule becomes defined. It is evident from the account of the above case, and from many others which might be cited having a similar history, that well developed tubercles may originate within a space of from two to three weeks. Tubercle was formerly considered to be a chronic disease, and the fact of giant-cells being developed in so short a time as three weeks has partly led M. Charcot to the conclusion that catarrhal pneumonia and tubercle of the lung are alike. I trust to show that this idea is totally erroneous and extremely misleading.

When we find that tubercle growths can be artificially developed within a few weeks in animals, as a result of injection of caseous material, there is not any difficulty in seeing how they may originate in a similarly short space of time within the human subject, where, practically speaking, the conditions essential for their production are the same. Secondary tubercle of the lung, no doubt, is occasionally a very chronic disease, but the primary form runs an acute course, the tubercle nodule being well developed in from a fortnight to three weeks.

Looking at the tubercle represented in Fig. 13, and comparing it with a nodule of catarrhal pneumonia, such as that seen in Fig. 11, there cannot be the slightest difficulty in recognising the essential differences between the two. In the earlier stages of development of a primary tubercle nodule there is a certain resemblance to catarrhal pneumonia, but, even then, there are inherent features which will be shown to exist in the tubercular growth, marking it as such from the commencement.

Before going further, it will be advantageous to examine in detail what the histological constituents of a tubercle are when it has reached its maximum stage of development. In Fig. 14 a representation of such a tubercle is given, magnified about 450 diams., taken from the lung of an adult. Throughout the tubercle several giant-cells (*a*, *a*, *a*.) can be noticed, their size

entitling them to the designation given to them. Compared with the "lymphoid" cells (*f*) shown at different parts of the figure, they are seen to be from ten to thirty or forty times larger. They are sometimes situated in the centre of the tubercle-nodule, at other times they are placed laterally.

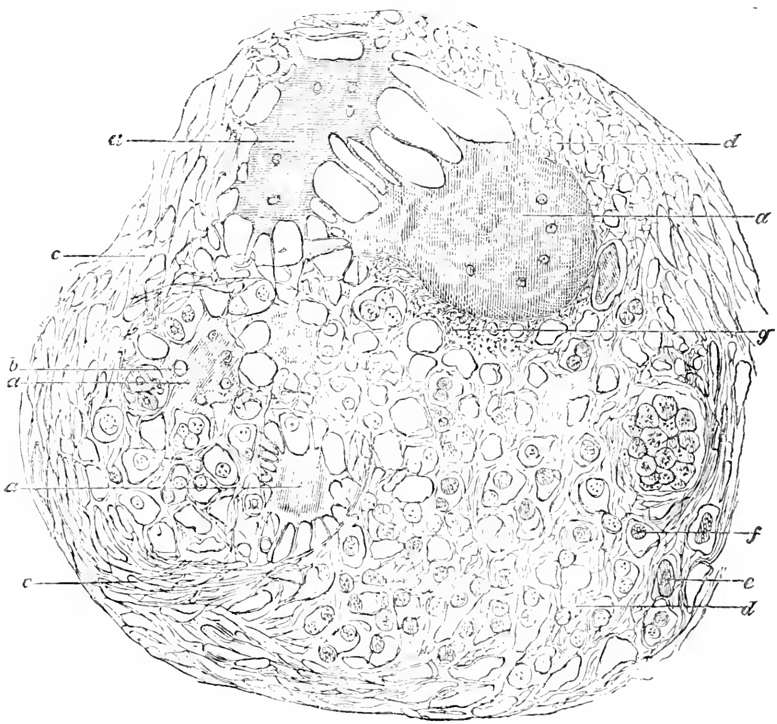

FIG. 14.—Fully developed tubercle of lung, × 450 diams. *a*, *a*, *a*, giant-cells; *b*, vacuole in one of these; *c*, peripheral capsule of fibrous tissue; *d*, reticulum of the tubercle; *e*, large endothelial-like cells lying on the reticulum and within its meshes; *f*, smaller "lymphoid" cells occupying the same situations; *g*, peripheral fibrous-looking periplast of the giant-cell.

These giant-cells, occurring as they do with the utmost regularity in all tubercular growths, are among the most remarkable of histological structures. Their form is varied, and those seen in Figs. 15, 16, and 17 will give the reader an idea of the shapes which are commonest.

While the cell is young, it seems to consist simply of a large mass of very granular protoplasm, sometimes with many nuclei

in it, but at other times devoid of these. As it grows older, however, the periphery becomes organised, forming an almost

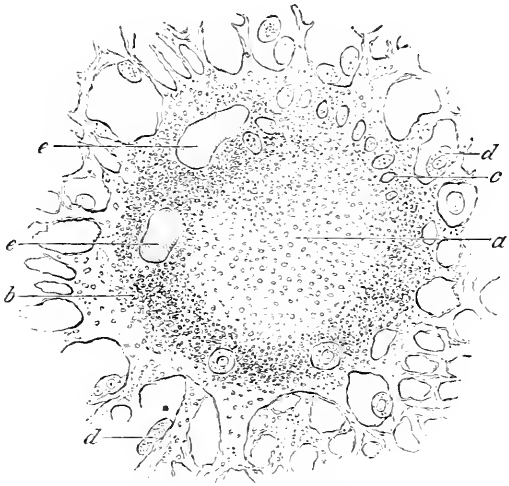

FIG. 15.—Giant-cell from centre of tubercle of lung, × 400 diams. *a*, granular protoplasmic centre; *b*, peripheral more formed periplast; *c*, crescent of nuclei; *d*, endothelial-like cells; *e*, two vacuoles within the giant-cell.

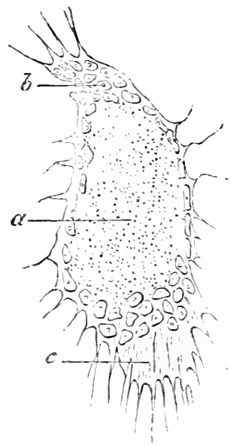

FIG. 16.—Large oval giant-cell from tubercle of lung, × 300 diams. *a*, granular centre; *b*, periplast, with nuclei, forming a mantle-like sheath; *c*, processes of periplast.

fibrous mantle-like sheath, in which great numbers of nuclei of an oval or round shape can occasionally be perceived (Fig.

16, *b*). These nuclei are frequently arranged in a crescentic manner at one end of the cell (Fig. 15, *c*) ; at other times they form an almost complete covering for it. The cell, when it has reached the size of those depicted in the figures, therefore consists of two distinct parts. The central portion is granular and protoplasmic, the peripheral is somewhat fibrous in character, and contains many nuclei. A vacuole is sometimes perceptible in the central protoplasmic part, but otherwise it seems to be uniformly granular. I have searched for a protoplasmic plexus within this portion of the cell, but as yet have been signally unsuccessful.

In giant-cells found within well-nourished tubercles, in which of course their ultimate development is to be looked for, a still further process of differentiation can be noticed in the peripheral part, in that it spreads out as a delicate film (Fig. 15),

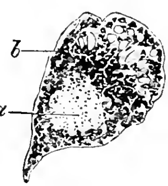

FIG. 17.—A giant cell from tubercle of lung, with inhaled particles of carbon in its interior, × 300 diams. *a*, central granular part ; *b*, peripheral pigmented portion.

which soon begins to show evidence of differentiation into fibres. The fibrillation of this peripheral film is, at first, very delicate, but soon becomes easily visible. The nuclei, which formerly were arranged round the central protoplasmic portion of the cell in the form of a mantle, are now spread out on the surface of this fibrous periphery, very much like the endothelial nuclei on a flat membrane. In all respects it seems as if the giant-cell of tubercle in old tubercles possessed the power of elaborating from its periphery a substance which ultimately becomes transformed into white fibrous tissue.

At a still later period the fibrous appearance just described becomes more defined, and then a separation into distinct bundles, or, as they are called, the *processes*, of the giant-cell ensues, which, as they stretch outwards, divide and subdivide

apparently by a process of splitting and contraction until a reticular tissue is produced (Fig. 14, *d*). The original nuclei of the peripheral portion of the cell now enlarge and lie flatly on the reticulum (Fig. 14, *e*), or they are contained within its meshes.

All this fibrillation and fibrous organisation of the periphery of the giant-cell has been accomplished at the expense of the central more protoplasmic area. This progressively diminishes in size as the peripheral portion becomes more differentiated, so that ultimately the giant-cell comes to have the appearance represented in Fig. 18, where the central protoplasmic part (*a*)

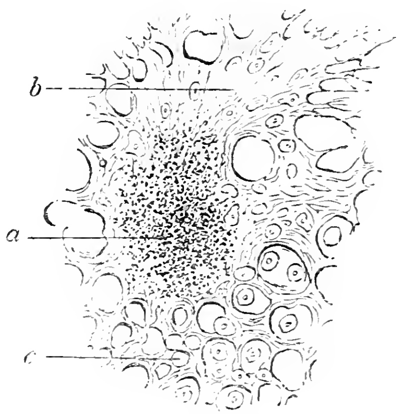

Fig. 18.—Remains of a giant-cell in process of fibrous transformation, × 400 diams. *a*, some of the central protoplasmic part still remaining; *b*, the peripheral portion, or periplast, which has now become developed into reticular fibrous tissue—nuclei are seen lying upon it; *c*, the reticulum constituted by the periplast.

is reduced to a minimum, while the peripheral part has been converted into a well defined flat fibrous membrane (*b*), or into a reticular fibrous tissue (*c*).

In the course of time the whole of the central part of the giant-cell is destroyed, being converted into a reticular fibrous tissue by a continuation of the process above described, while the original nuclei of the peripheral mantle-like sheath remain upon the fibrous walls of the meshes of the reticulum as their connective-tissue nuclei. The further effects of this fibrous

transformation of the giant-cells on the tubercle nodule will be traced when the degenerations to which tubercle is liable are described. In the meantime this preliminary statement as to the evolution of reticular fibrous tissue from giant-cells will serve to render the structure of tubercle intelligible, and will show what the genetical significance of the central protoplasmic part of the giant-cells is in relation to the more highly organised periphery. The one represents an embryonic formative tissue or nucleus, the other stands in the relation of a connective tissue periplast. The mode of development of the one from the other corresponds to that pursued in the construction of all fibrous tissues.

A tubercle, therefore, when full-grown, consists of a small, rounded tumour, made up of one or more giant-cells, from which multiple fibrous processes radiate, and constitute a reticular fibrous tissue. The walls of the reticulum are distinctly fibrous in character, and, when carefully examined, are seen to be flat membranes, on which nuclei lie, very much as on any fibrous connective tissue. These nuclei sometimes become detached, and are thrown off into the mesh of fibrous tissue, thus accounting for the lymphoid and epitheloid cells, which have been so often described as elements of the tubercular neoplasm (Fig. 14, *e* and *f*). The variety in size and shape of these lymphoid and epitheloid cells of tubercle is so varied as to preclude the idea of their being blood-leucocytes, as has sometimes been supposed. The largest of them are known as small giant-cells (*sic*), on account of their dimensions, while the smallest are about the size of a blood-leucocyte; all possible gradations in size between these two are perceptible. They probably have the power of wandering through a certain area, but their capabilities in this respect must be limited, on account of the close-meshed reticulum in which they are contained.

I would consequently look upon the greater number of the lymphoid and other small cells found within a tubercle as endothelial in their nature, and as in reality representing the connective-tissue nuclei of the fibrous reticulum on which, or within which, they lie.

Towards the periphery of the tubercle the meshes of the reticulum become closely pressed together and flattened, so

that its walls constitute a fibrous capsule, as it were, in which the giant-cells and other elements are inclosed (Fig. 14, *c*). This forms the boundary of the tubercle or "giant-cell system," as it may be called. A tubercle nodule is made up of a single such "giant-cell system," or, what is quite as common, of two or three of these "systems" combined. When the latter is the case, the different "systems" are bound together by fibrous tissue in which there are usually many nuclei. The older the tubercle is the better developed does the fibrous capsule at the border become, and, as it grows thicker, we shall see that it encroaches upon the interior of the tubercle, and is ultimately accompanied by absorption of most of the cellular elements.

In primary tubercle of the lung, of the age we have supposed in the case previously related (two to three weeks), it is seldom that the giant-cell systems are so completely developed as in secondary tubercle of the lung, where the disease runs a chronic course, and where, in addition, there is not the same liability to rapid caseation. If caseation should occur while as yet the tubercle is in an embryonic state of development, its structure is of course destroyed, and its further progress is necessarily cut short. In primary tubercle of the lung we could not therefore expect that the "giant-cell systems" should be so characteristic as in the secondary form, but, in all cases, the giant-cells, at least, and the same tendency to the peculiar development above described, can be easily detected (Fig. 13). In certain nodules, moreover, where caseation has not occurred at an early period, the "giant-cell system," in all its points, is perfectly developed even within this short period.

In every tubercular organ, if sufficient time has elapsed, the structure just described as characteristic of tubercle of the lung is to be seen either completely or partially developed. We accordingly have, in the histological composition of tubercle, a sure method of diagnosing those tumours which are tubercular, and of rejecting those which, although they may resemble tubercle in their gross characters, nevertheless prove to be totally different in their nature when more minutely examined.

(*To be continued.*)

SOME CASES IN WHICH MORPHIA HAS BEEN ADMINISTERED IN LARGE DOSES HYPODERMICALLY; WITH REMARKS.

BY ROBERT PARK, L.F.P.S., GLASGOW.

Amongst the very first cases in which I used morphia hypodermically was that of Mrs. S. W. I was in charge at the time of the practice of the late Mr. Prideaux Adams, who was surgeon to the Chatham Workhouse. I give the report of the case as written at the time :—S.W., æt. 36, admitted into Workhouse, October, 1869.

This woman was of large and strong build. She was married but parted from her husband, and lately has been a prostitute residing in Holborn Lane. When admitted, I had the following history of her given to me by — Hutchins, Esq. She had been dressing herself in all the tawdry finery she possessed, and paraded the streets in an extravagant fashion. She was personally very clean, and her room was like a new pin. When Mr. H. visited her for the purpose of examining her as to the state of her mind, she flew at him, and swore that he should not meddle her. She had been twice confined in the County Lunatic Asylum, and had only been a few months out.

When she came under my charge, she was suffering from delirium tremens; she was violent and unmanageable; fancied herself Lady Campbell; has spectral illusions; was sleepless and restless, getting out of bed constantly. October 8th, Adhib. Haust. Chloral, ʒss.

October 9.—Found she would not take the draught, and so had a restless night, being so violent towards morning as to

necessitate her being put in the straight-jacket: though this was done without my consent, asked or received. Whilst she was yet in the straight-jacket, I prepared a draught of chloral to give with my own hands, but I could not prevail upon her to take it. She was in a "merry delirium," laughing, singing snatches of songs, and making lewd remarks and gestures so far as she could. Her eye had a peculiar wicked appearance. Not being able to administer medicine by the mouth, and having ascertained that her bowels had been moved, that she had passed water, and that her tongue was clean, I resolved to use subcutaneous injection of morphia. I at first slowly injected a quarter of a grain, but after waiting some time there was no effect produced. I therefore injected another quarter-grain, then another, and then another in rapid succession. Here I thought it prudent to pause. The injection had not produced the slightest effect upon my patient. I was sure my solution was right. I was very much chagrined at the failure of the injections, and almost afraid to push them any further. On reflection, however, I felt convinced that I could not do wrong by producing the wished-for physiological effect. I therefore now injected half a grain, but was still disappointed. As there was a large amount of subcutaneous fat on the inner surface of the thigh, which was the part I had chosen for injection, I thought it possible that I had not penetrated beneath it, and that this might be the reason of my want of success. I altered the nozzle of the syringe therefore from the shorter to the longer, and then plunged it down as far as it would go, and slowly commenced to inject again, carefully watching the pulse, the breathing, and the pupil of the eyes. No effect whatever was produced till three grains in all had been injected. Faint symptoms of drowsiness then began to appear, and the singing, muttering, and talking, which had been going on all during the injection, stopped. She did not sleep for three quarters of an hour after I left her, when she slept on till the early morning.

October 10.—When I visited her this morning, she was apparently well. All her delusions were gone; she looked sheepish and ashamed of herself. I thought it advisable however to put her on digitalis in case of a relapse, wherefore she had ʒss. of the tincture every four hours.

October 12.—Complains of lassitude and weakness. Tongue slightly dry and brownish. Ordered, Mist. am. et cinchonæ.

October 14.—Found on my morning visit that she had passed a restless night, had refused to take her medicine, and was violent. Injected two grains of morphia acet. subcutaneously.

October 15.—Found the injection of yesterday had not had the slightest effect. Ordered her a chloral draught, which the nurse got her to take on promise of getting her some brandy on the sly.

October 16.—Being Sunday, I had not made a morning visit to the house. In the afternoon I was sent for in great haste to go and see her. I found her sitting up dressed, but guarded by four persons. I was informed that she had been very violent, and threatened the nurse, whom she had struck. She was now however perfectly quiet, and spoke quite rationally to me, upon many subjects several times. As I was averse to using the straight-jacket, and as we had no padded room to put her in, I resolved to try the hypodermic again. The solution was the same as I had used previously. It was labelled "St. Bartholomew's Hospital," Chatham. This solution contains one grain in twelve. I used the longer nozzle of the syringe, and took care to sink it beneath the subcutaneous fat; in short, I took every precaution to ensure success, and yet before I obtained the desired effect, I had to inject ♏60, being equal to five grains of acetate of morphia. At the conclusion of the injection faint symptoms of drowsiness made their appearance, but she did not drop asleep till half an hour afterwards, when she slept on till the morning.

October 17.—When I visited her on the next morning, I found her sitting up in bed, but with unmistakable symptoms of opium narcosis, the pupil being contracted to a fourth of its usual diameter, and there being heavy pains of the head. I ordered her two glasses of wine and a chloral draught in case she should not sleep at night.

Mr. Hutchins saw her with me in the course of this day, but did not observe any symptoms of opium narcosis. Two days after she was sent to Barming on my certificate of partial moral mania, she being an erotomaniac as well as a dipsomaniac.

The next case worthy of record was reported in the *Practitioner* for March, 1880.

CASE 3 was one of sciatica of an aggravated type, being recurrent, and in the person of a medical man who could not accord to himself that rest which is admitted on all hands to be a *sine qua non* in the treatment of this affection. The treatment extended over three months, during which the patient was incessantly engaged in night and day practice. At the beginning of this period one-grain injections were used night and morning over the affected regions, but these were only sufficient to assuage the pain, not by any means to annul it. Accordingly, *always at the patient's own earnest solicitation*, and frequently with great misgivings, the strength of the injections was sensibly increased till the middle of the period, when, on one occasion, several injections having been missed, and the pain having gained to an overmastering extent, I was compelled to empty the syringe, containing three grains and a half in solution, before relief was obtained. The anxiety which accrued to myself, however, for some hours after the administration of this last dose made me resolve not to be in a hurry to give the same again. To the patient, however, no bad results accrued, but, on the contrary, he stated that he had not had such complete relief for weeks. In carrying out my resolve, therefore, I had great opposition, and after withdrawing the syringe when one grain and a half had been injected, I was frequently constrained, after a time, to introduce it again, and inject an additional grain or half-grain. In this chariness to go beyond a certain empirically limited dose, however, I must confess to having been actuated more by vague fears, and consideration for my own peace of mind, than by any experience of or knowledge I had acquired of the baneful effects of a large dosage. On the contrary, just about this time, Mr. Lawson published his work, *Sciatica, Neuralgia, and Brachialgia*, and a perusal thereof seemed to confirm me in the belief that our dosage was as yet empirical, and that this treatment might be followed for long periods, *when really required* for *the alleviation of pain*, without detriment to the system afterwards. The perusal of Lawson's book showed that a freer regimen of stimulants was pursued consentaneously with the hypodermic treatment, but I do not know that this was a benefit. However, at the end of the period named the patient's ailment was very much benefited—nearly well—and

a three weeks' sojourn at Buxton pretty well completed the cure.

After the injections the patient generally reclined upon the sofa for fifteen minutes or half an hour, and then went about as usual. Very generally, and especially after the larger doses, nausea and (rarely) retching supervened. Sometimes an ounce or an ounce and a half of whisky was taken previously, and sometimes after, and this did seem to modify the action of the morphia materially. Sleep was *never* produced as a direct result so far as I could judge. I never, for instance, heard him say that he had fallen asleep in his carriage or by the bedside. When, however, owing to the pain sleep would not have been procured otherwise, an injection, *if of sufficient strength to annul* the pain, would allow of sleep of a refreshing character; but, that it did not induce sleep was proven by two facts, namely, (1) that, however tired and wishful of sleep the patient might be, if the injection went short of annulling the pain, only a dreamlike, unrefreshing repose was allowed, in which the pain was felt as "afar off," and (2) that, if again the dose happened to go beyond what was necessary for the annulment of pain, insomnia resulted.

Case 4.—Acute neuralgia, ovarian neuralgia, and partial peritonitis, all occurring at different times in same patient. This patient presented a clinical illustration of that extremely mobile condition of all the nerve centres known as hysteria, and closely allied to epilepsy; and yet the case was not one of hysteria; that is, all of what may be called the "humbug" elements were absent. For many months, and more or less for many years (the patient was twenty-seven years of age, and married, but as yet childless), this patient had suffered from metastatic pains and aches, culminating every now and then in a fearful nerve storm, particularly about the menstrual epoch, and involving very generally the fifth cranial nerve: one or other hemisphere, or the whole encephalon. These nerve-storms were and are accompanied by the most complete prostration of mind and body, and a slow heavy-laboured pulse. Doses large and doses small have been used in this case, and frequently, but *not continuously,* over a period of six or seven years, and the general conclusions derivable are to the effect that (1) in such cases small doses

(those of one grain and under) are really of no use whatever in quelling the nerve-storm; (2) neither small nor large doses ever produced sleep, but frequently insomnia, *directly;* (3) small doses increased or engendered appetite and digestive capacity, whilst large doses, if given soon after a meal, produced prompt emesis, *on the assumption by the patient of the erect position*, but only nausea, or, more properly, a feeling of increased *peristalsis* of the stomach, if the patient reclined. It is worthy of remark also that this increase of peristalsis was often communicated to the bowels, giving rise to audible rumbling. After emesis the appetite was keen, and, if satisfied, emesis did not readily occur; but retching was apt to ensue on the assumption of the erect position as long as sixteen or eighteen hours, or perhaps longer afterwards.

Lastly, for various reasons it was impossible to ascertain the true effect of the drug upon the alvine evacuations. Occasionally it seemed to have a directly purgative action; the remote action, after large doses, is frequently so.

It certainly cannot be averred that it increased either in large or small doses the normally constipated condition. In the *Glasgow Medical Journal* I published a case of Bright's disease (small granular kidney), where large doses were frequently given, and at times continuously given, for the relief of insomnia and orthopnœa. The doses were not only palliative to an unexpected extent, but also seemed to act remedially. At all events the patient's life was prolonged under the treatment.

CASE 5.—Pericarditis with plastic effusion, endocarditis with aortic and mitral incompetence, and carditis. A rare case. Unfortunately I could obtain no P. M. The carditis seemed to be the painful element in the disease, and surely greater agony than the subject of it endured no man ever witnessed. Every beat seemed to be accompanied with the most excruciating pain. I am glad to reflect that I was frequently able to relieve her sufferings, but this desirable consummation was not accomplished frequently till my hypodermic syringe, holding three grains and a half in solution, was emptied to the last drop. Great relief to suffering was obtained and refreshing sleep, and no bad effects; not even the usual nausea and retching, and

this although the patient never entirely lay recumbent. After the first injection she was blistered over the heart repeatedly, and various lines of treatment were tried successively to overcome and remedy the cardiac inflammation and lesions. The injections were not given continuously, but only as occasion seemed imperatively to demand. In spite of all efforts the patient succumbed after being under my treatment for five weeks. For several days before her death I took care that she had no injections.

Case 6.—This case occurred in the practice of another medical man, and I only saw her upon two occasions. The patient, a female, was passing through the climacteric period, and had been confined to bed for more than twelve months prior to my seeing her. She gave me a history of her ailment in a series of panting respirations or gasps which numbered between thirty and forty per minute. Her pulse was not perceptible at either wrist except occasionally, and with the aid of three finger tips laid along the course of the radial. It was impossible to count it therefore with any approach to accuracy. She had a blanched and pallid look such as one often sees in the renal cachexia, but inquiry failed to trace any renal trouble. The normal cardiac murmurs were muffled, but not replaced by any abnormal sounds, and so far as an imperfect physical examination would allow me to make out, both cavities were dilated. She complained of great pain over the epigastrium, for relief of which she wore a belladonna plaster, and she stated she could get no sleep. Her complaint originated in her getting into an ungovernable passion with a daughter who had allowed something indecorous to take place.

Taking my cue from this last piece of information, I made a provisional diagnosis to the effect that her illness was really a neurosis of the pneumogastric, and that the anæmia and dilatation of the heart were secondary. I accordingly sent for my hypodermic syringe, and injected a sixth of a grain of morphia, with the effect, as I learnt afterwards, of giving her the best night's rest she had had for weeks; and the result next day of finding the number of respirations diminished, the palpitation lessened, and the pulse more perceptible at the wrist. About a week or ten days after I saw her, however, I heard of her death.

Although the dose administered in this case was not really, it was relatively, large. I doubt if any one who had not had some special experience would have had the courage to give morphia in such a case in any dose whatever. It is recorded here more for the purpose of illustrating the physiological and therapeutical effect of the drug administered hypodermically than anything else.

CASE 7.—A case of cancer uteri of about nine or ten years' standing. The patient, a female, is thirty-nine years of age, and has had two of a family. Has been in Edinburgh Royal Infirmary twice, once under Sir J. Simpson, and once under Dr. Matthews Duncan, and once in the Royal Infirmary here under Dr. Stirton. She has been under my treatment as a parish patient for about a year, and previously for two years and a half as a private patient—three years and a half in all. During that time the cancerous disease has been gradually extending, and the symptoms she has complained of have varied, sometimes being referable to one, sometimes to another organ. Presently the pelvis is pretty well filled with a hard, nodulated mass rising into the abdomen. At the menstrual periods the abdomen enlarges greatly, and a large quantity of blood and matter is discharged. At these times her sufferings, which are always great and never entirely suppressed, are very much aggravated.

Very early in her complaint she obtained relief by hypodermic injections, of what strength I know not; she seems to have got them with regularity, however. They were continued in the infirmary during her various stays in them, and subsequently she had been in the habit of getting them occasionally, and when she did not get them, she admits having had to take large doses of opium in some form or other in order to relieve pain. She will not admit that she has any craving for the drug itself, and states positively that if she could be relieved of her pain any other way, she could give up the drug at once. It was during an exacerbation of her malady that I was first sent for to see her. She stated she was getting no relief to the pain from taking large doses of opium by the mouth, and wanted a hypodermic injection. She was retching continuously, throwing her arms about, breathing rapidly, and with a pulse of 140, soft

and diffluent, seemed altogether in a very serious condition. I refused at first to administer the morphia as desired, but on hearing the history detailed above, and learning from the husband that she had been frequently "as bad before," I allowed him to go to my surgery for the syringe. One grain and a half was slowly injected to the manifest relief of all the symptoms. Since then this woman has had a very great number of injections at my hands. She has often intermitted them as long as a fortnight at a time, but latterly has had them more continuously. At the menstrual epochs she requires larger doses—as much as four grains have been given—also when she has been many days without one, or when she wishes to be able to do a day's washing or any unusual domestic work. She frequently goes for days without any food, and states that latterly the only times that she can look at food is after she has had an injection. I have sometimes to go to her house, but, as a rule, she comes to my surgery. She informs me of this curious fact, namely, that when I give her the injections at the house, and when she is in bed, she is invariably sick after them, but that when she comes to the surgery, and gets out into the open air and walks about for half an hour, she is not sick, but gets strong and able to walk up the four stairs to her garret.

In addition to these, I have used morphia in large doses in many cases of peritonitis, always with benefit, and never with any bad result.

General Remarks.—Altogether apart from interfering conditions, it would appear that the sedative, anodyne, and hypnotic effects of morphia do not go together. Hypodermically administered, and even in large and tonic doses (*i.e.* what, administered otherwise, would be tonic), the hypnotic result may not be obtained. In certain cases of mania specially, the tolerance is very great. The tolerance seems to be proportioned to the *intensity* of pain as well as the *quantity*.

When the case of mania came under my care, I was under the impression that the effects of morphia became immediately manifest when hypodermically used. Perhaps, physiologically, this is the fact; but therapeutically it is not, as the pathological state frequently modifies. Serious mistakes might result if this were not borne in mind. In practice I have seen from three

minutes to half an hour elapse before the full effects of an injection became manifest, and I have even seen ten minutes elapse before the effects of the injection were felt by the patient.

It is an extraordinary fact that in not one of the numerous cases in which I have used these large doses did the ordinary phenomena of narcosis ensue; nay, rather none of the phenomena of narcosis whatever ensued. We might surely expect in the event of administering the equivalent of any of the doses above mentioned by the mouth or rectum that the effects would be—profound sopor, stupor, stertor, gradual paralysis of respiratory muscles and death; or failing this last, intense general malaise and disordered nutrition and secretion.

THE HISTORY AND THERAPEUTICAL VALUE OF ARSENIC IN SKIN DISEASES.[1]

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General History.

It is always of interest to study the history of any method of cure by any drug, and it is especially interesting in the case of arsenic, from the alternate excessive confidence in and excessive suspicion of it at different periods. From a study of these different periods we shall be able to perceive the mistakes that have been made, and see the necessity of arriving at a rational theory for its use. We shall see that it was the purely empirical knowledge of the early and even the comparatively late physicians that led them to take exaggerated views about it; but I desire here to base whatever conclusions we may arrive at as far as possible on a physiological basis.

Dioscorides [2] used arsenic as a remedy internally for asthma and inhaled for spasmodic cough, and his remarks were copied by Pliny, Galen, Cœlius, and other great physicians of the Roman empire, who prescribed it for ulcers of the lungs and intestines, and asthma, but after their decline it seems to have fallen into disuse in Europe.

However, the Arabian physicians derived a knowledge of it from them, and Rhazes and Avicenna gave it for diseases of the skin, such as scabies, lepra, and herpes, for the diseases of the

[1] Read before the Medical Society of London on April 5th, 1880.

[2] Harles, *De Arsenici Usu in Medicina*, p. 49, 1811.

lungs, as asthma, spasmodic cough, and spitting of blood, piles and malignant ulcers.

From the Arabians, Paracelsus adopted it and tried to bring it into use as a medicine, but the prejudices against it, owing to its frequent use as a poison, were so strong that this attempt was used as one of the arguments to prove him a charlatan.

Among the physicians of the sixteenth and seventeenth centuries, only two are recorded as making use of it; Wirth, about the year 1570 for asthma, and Jean de Gorris, chief physician to Louis XIII. of France, in ulcers and many other diseases.[1]

But though it was neglected by the physicians of the time, it was largely used among the people in Germany, France, and Italy, and prescribed by quacks. Lemery, the chemist, in 1675 says it was much used in France for quartan fevers, and Sperling in 1685 attests the frequency of its use in Styria and Bavaria.[2]

In the year 1700 Adrian Slevogt published a treatise on arsenic in which he recommended it and justified its use on medical grounds. His conclusions were supported by Frick of Ulm in his book on poisons, 1710, but equally strongly opposed by Stahl and Wedel. Slevogt[3] summed up the controversy in his book on the subject in 1719, in which he gives statistics of his great success in quartan and tertiary fevers. It still continued much in vogue among quacks,[4] and Ackermann mentions a family who made use of it as a family secret against intermittent fevers, herpes, and melancholy with good results, but only two physicians of repute, professors at Vienna, named Plencitz, father and son, gave it systematically, and with invariable success for forty years in intermittent fevers even during an epidemic. Their success however did not prevent opposition, and even the great Linnæus declared it ought not to be used as a medicine, and eventually the disastrous failure of an arsenical febrifuge when used by Prof. Stoerk again made it once more unpopular.

In this country arsenic had long been used as a quack[5]

[1] Harles, p. 58.
[2] *Diss. de Arsenico*, Wittenburgh. 1681.
[3] Slevogt, *De Arsenico*, Jena, 1719.
[4] Harles, p. 70.
[5] Desgranges, "Sur l'Arsenic," *Journal Générale de Médecine*, vol. xxx. 1807, p. 254.

remedy in ague and intermittent fevers, and a preparation of tartarised arsenic, called in the Pharmacopœia of Edinburgh "solutio mineralis arsenici," was well known as a remedy even against certain cutaneous diseases. One of these quack remedies, known as ague drops, which seem to have been identical with the fever drops spoken of by Neumann as much used in Berlin, was analysed for Dr. Fowler of Stafford by a chemist named Hughes and found to be a saline solution of arsenic. He[1] published a pamphlet in 1786 entitled *Arsenic in Ague, Headaches, and Intermittent Fevers*, in which he gives the prescription called after his name, and describes several cures due to his remedy.

Fowler's Solution—Original Prescription.

Solutio mineralis.

Recipe arsenici albi in pulverem subtilissimum triti.

Salis alkalini fixi vegetabilis purificati, singulorum grana sexaginta quatuor.

Aquæ fontanæ distillatæ libram dimidiam.

Immittantur in ampullam florentinam qua in balneo arenæ posita, aqua lente ebulliat, donec arsenicum perfecte solutum fuerit. Deinde solutioni frigidæ adde.

Spiritus lavendulæ compositi, unciam dimidiam.

Aquæ fontanæ distillatae libram dimidiam, plus vel minus, adeo ut solutiones mensura libra una accurata sit, vel potius pondere, unciæ quindecim cum dimidia.

℥j = 4 grs. ʒj = $\frac{1}{2}$ grs.

Nevertheless much opposition was raised against Fowler on account of the supposed danger of the drug, so much so that Willan[2] thought it necessary in the *London Medical Journal* to declare that he had seen the best results in seven cases under his care. Dr. Pearson and Sir George Baker[3] also gave their testimony, and the former substituted a solution of his own for that of Fowler. The greatest opportunity of attesting the success of

[1] *On the Effect of Arsenic in the Cure of Ague, Intermittent Fevers, and Periodic Headaches*, London, 1786.

[2] Willan, *Lond. Med. Journ.* 1787.

[3] Pearson, Bradley's *Med. and Phys. Journal*, London, 1806.

arsenic in fever was given to the army surgeons, of whom Dr. Jackson, in St. Domingo, Dr. Winterbottom,[1] in Sierra Leone, and Macleish[2] in Corsica, universally approved of it even in preference to quinine.

Even before the acknowledged success of arsenic in intermittent fever, it had, like all other remedies, been attempted in cancer. In France, Lefebure Justineau, whose prescription became a family secret among the Earls of Arundel, and Salmade, had invented various preparations.[3] In America, Rush in his *Medical Enquiries*, and in Sweden, Roennow and Ohdel, all published cases of cancer cured by the internal use of arsenic. Dr. Simmons of Manchester in the year 1796 published a book on the use of arsenic in cancer in which he declared it to be a specific, and in articles constantly contributed to the medical press quoted cases in which he had been successful. From our present knowledge of cancer it seems that it was rather to an error of diagnosis than to the action of arsenic itself these cures must be attributed, for when used in skilled hands such as those of Desgranges it was valueless. The popularity that had been acquired by arsenic after its introduction by Fowler for intermittent fever caused it to be tried in England for various diseases, and Dr. Alexander of Halifax professed to have cured angina pectoris, epilepsy, and convulsions from worms, Dr. Jenkinson rheumatism, and Dr. Ferrier whooping cough, and John Hunter himself, owing to a report of its successful use among the natives of India, is said to have recommended it for hydrophobia.[4]

The early medical history of America has not been sufficiently noticed, and the authors on the continent of this date refer to Anglo-American physicians as if there were but one school of medicine for the two countries. Whether this was so or not, it cannot be affirmed, but there is no doubt that arsenic was used in America very shortly after Fowler introduced it in this country. Dr. Rush of Philadelphia, who has been previously mentioned, was the first, as far as can be ascertained, to rely on arsenic as a remedy chiefly in cutaneous,

[1] Winterbottom, *Medical Facts and Observations*, vol. vi. 1795.

[2] Macleish, Duncan's *Annals of Med.* vol. ii.

[3] Harles, p. 109-112. [4] Harles, p. 82.

cancerous, and scrofulous diseases. He was supported by William Currie, also of Philadelphia, who strongly advocated its use in intermittent fevers, and by Prof. Barton,[1] who seems to have been to Rush what Pearson was to Fowler, and who gave it in the form of pills combined with opium. After Barton's time the remedy came into regular use in the United States.

In Germany, where arsenic had been first studied and successfully tried, it had, as we have seen, fallen into complete discredit, and was entirely abandoned by the profession. At the commencement of the present century, however, it was re-introduced into legitimate practice by Oberreich,[2] who used it in a great variety of diseases. Whether his advocacy would have been sufficient to have brought it into general use may be doubted, but the increasing price of quinine, owing to Napoleon's continental system, gave rise to an imperative demand for some cheaper febrifuge. Heim, in his book on arsenic in fever, drew attention to this remedy, and described the good effects he had procured from it. The great extent to which it was now used indiscriminately is proved by a proclamation of the King ot Prussia in 1810, which, after describing in the preamble the value of arsenic in intermittent fevers, proceeds to make regulations as to its sale by druggists, and forbids its use except when prescribed by a medical man. The solution which was legalised by this proclamation was practically the same as Fowler's. Hahnemann, in his studies on Materia Medica, experimented with arsenic, but he gave it in such infinitesimal doses that, as Harles[3] justly remarks, he could get no really good from it. In the year 1811, Harles, a Bavarian, summed up in his treatise, *On the Use of Arsenic in Medicine*, all the early history of its use, from which the foregoing sketch has been largely derived. Besides working out the earlier history of the drug, he describes its general physiological and therapeutical effects, and gives directions and warnings for its use, based on experiments by himself and his friends, which he gives at great length.

About the same time as the value of arsenic was universally recognised owing to the labours of Fowler in England and

[1] Harles, pp. 85, 87. [2] *Ibid*, p. 114. [3] *Ibid.* p. 113.

Harles in Germany, Brera [1] adopted it at his clinique at Pavia. He prescribed it chiefly for the fevers of North Italy, and in the year 1806 published in his *Clinical Observations* a sound estimate of its use and a complete refutation of its opponents. His pupils, however, in consequence of his recommendations and success, fancied it a specific, not only in fever, but in nearly all other diseases.

It is in France that the history of arsenic is most instructive. After its general use in the tenth century it fell into discredit among physicians, though much used by the people themselves and by quacks. The successful revival of its use by the English and Americans, the Germans and Italians, could not long be neglected in France, and it was an army doctor who had practised in America and travelled in England, Louis Valentin, that first made it known in France by articles in the *Journal de Médceine.* The first book that appeared on the subject was by Dr. Fauves, published at Paris, 1804, under the name of *Clinical Researches on the Effects of Arsenic in Intermittent Fever,* but Dr. Fodéré, physician to the military and civil hospital at Martigues, was the first to use it in large quantities. In 1809 he described the success he had had in more than 300 cases of intermittent fever by means of arsenious acid, which he had first used in spite of himself, owing to the lack of quinine.

Dr. Niel, first physician to the hospital of Marseilles, declared he knew no febrifuge equal to arseniate of soda, and Desgranges, in a remarkable article in the *Journal Générale de Médceine* in 1807, describes the practice with this drug in England and America, and confirmed the results from his own experiences. In spite of the testimony of so many eminent physicians, and the universal success they had reported, Deidier, Peyrilhe, and Thibaut violently opposed its introduction, and were enabled once more to procure its disuse. Yet all did not acquiesce in its rejection, and both Cazenave in 1833 and Trousseau in 1837, in articles in dictionaries, assert its therapeutic value, but without any appreciable result. It was reserved for Boudin,[2] physician general to the French army in Algeria, to finally re-establish it in practice, in consequence of his success with it in the

[1] Harles, p. 99.

[2] Boudin, *Traité des Fièvres Intermittentes,* 1842, p. 250.

prevalent fevers there. In 1842 he published his first treatise, and in 1845 presented to the Academy of Medicine a new memoir, in which he stated he had cured 3,000 intermittent fevers with arsenious acid, without a single case of failure or a single accident. This statement created great excitement, and was followed by an equal amount of support and detraction. It is unnecessary to mention the names of all who joined in the discussion that ensued, but in the end its value in fever was generally recognised.

It will be seen from this short history that arsenic suffered many vicissitudes before it was recognised in general medicine. Though prescribed by Galen and Cœlius, it was neglected in the middle ages, and when re-introduced, probably from the Arabians, soon again became unpopular. The cause of this unpopularity is to be found rather in its having been recognised as a typical deadly poison than from any accidents in its therapeutic administration, but this was strong enough to completely banish it from the domain of medicine. At last, at the commencement of the eighteenth century, it was for the first time properly tested by Slevogt, but his researches were not able to make it generally popular in the face of violent opposition based on its alleged poisonous properties. All through this time, it had been universally used as a quack remedy in fever and ague throughout Europe, and it was from one of these quack remedies that Fowler of Stafford derived the solution which bears his name. His success was soon followed up by other English physicians, and arsenic became once for all an established English remedy. It was equally quickly re-established in Germany, where it had fallen into discredit after the death of Plencitz, and in Italy mainly through the authority of Harles and Brera. In France the labours of Fodéré, Desgranges, and others seemed to have been equally successful, and at the beginning of the nineteenth century it seemed to be thoroughly recognised, yet it once again, owing to the violent opposition based on the old suspicion of its dangerous character, was rejected. It was not till the discussion raised by the memoirs of Boudin was over that it took a permanent place in French practice.

(*To be continued.*)

Reviews.

Photographic Illustrations of Skin Diseases. By GEORGE HENRY FOX, A.M., M.D. New York: E. B. Treat, No. 805, Broadway.

THIS Atlas of Skin Diseases, it is announced, will be complete in twelve monthly parts, each part containing four plates, and consists of photographs coloured by an artist who is a member of the medical profession, and is familiar with skin diseases. The appearances presented by diseases of the skin are so varied that any good atlas must always be welcome. The four parts of Dr. Fox's series of illustrations which have already appeared contain some photographs of considerable merit, although the excellence is not equal throughout. These plates show that photography can be usefully employed in forming dermatological collections, whilst they also show that the results fall short of those obtained by the use of lithography. The author deserves the thanks of the profession for undertaking this work.

Skin Diseases, including their Definition, Symptoms, Diagnosis, Prognosis, Morbid Anatomy, and Treatment; a Manual for Students and Practitioners. By MALCOLM MORRIS, M.R.C.S. 8vo. pp. 288. London: Smith, Elder and Co. 1879.

THIS book on skin diseases holds, as regards size, a position midway between the short so-called students' guides and the larger works on skin diseases. Essentially, we might perhaps say with justice, entirely, a compilation, it has the usual merits and demerits of books compiled with care and intelligence. It contains a great deal of condensed information on many subjects, some of them, such as typhus and scarlatina, of the highest importance, others, such as lice and warts, of interest chiefly to the specialist, but always displaying on the part of the author evidences of industrious reading. It is inevitably to the disadvantage of such books that they are dry and tough of digestion, but we hope in future and larger editions the author may find more extended

scope for introducing matter which will give the work the grateful flavour of originality.

Ocular Therapeutics. By L. DE WECKER, Professor of Clinical Ophthalmology, Paris. Translated and Edited by Selton Forbes, M.A., M.D. Smith, Elder and Co. 1879. pp. 552.

M. WECKER'S treatise is both interesting and instructive. Occupying a very distinguished position as a specialist in Paris, and enjoying large opportunities of observing ophthalmic disease, and of trying on a great scale the value of every novelty that may be proposed either in the way of operative procedure or of the application and administration of drugs, he always speaks with weight, and in general is able to support his opinions, not only by *à priori* reasoning, but by an appeal to facts which have presented themselves to his own observation.

M. Wecker is already well known as an author, and has published the most complete treatise on the diseases of the eye in the French language. The present volume may be regarded as a condensation of this larger work, in which the anatomical details have been materially curtailed, whilst the methods of treatment of the diseases affecting the several tissues and humours of the eye are given in an extended form. It is in fact an epitome of our present knowledge of ocular therapeutics, and we venture to think that few ophthalmic surgeons even will read it without finding some proceedings that have escaped their notice, whilst the general surgeon, for whom it is primarily intended, will obtain many suggestions that may aid him in effecting a cure of those ordinary affections which are often rebellious, and which require a change of treatment that he may not venture, without authority to support him, to try.

In speaking of purulent ophthalmia, M. Wecker states that the more he observes facts the more convinced he becomes that those alarming complications of the cornea which constitute the great danger in purulent ophthalmia, and mark it off so clearly from catarrh, are due to the action of the discharge upon the corneal epithelium, and upon the property which the purulent matter has of migrating through tissues denuded of their protecting epithelium. There is no doubt some truth in this. At the same time, however, it must be observed that this view compels us to consider that the activity of the pus corpuscles is much greater in certain forms of purulent ophthalmia, as, for instance, in gonorrhœal ophthalmia, than in the ordinary purulent ophthalmia of infants; since recovery with loss, or at least serious lesion, of one or both eyes is the rule in the former case and the exception in the latter, and it is unreasonable, we think, to admit that the liquor puris possesses in gonorrhœal

ophthalmia peculiar septic properties, leading to destruction of the cornea, which are not present in ordinary pus. Dr. Wecker employs, in common with most English surgeons, weak solutions of nitrate of silver in preference to the strong solution or solid nitrate recommended by the Germans. We notice also that he recommends incision of the external commissure which has lately been practised with success in this country. He particularly insists upon the advantages possessed by eserine over atropine. Its action, he says, is truly marvellous in extensive ulcerations, both with and without perforation. In such cases he has succeeded in healing with flat and slightly marked cicatrices ulcers which would probably have occasioned staphylomatous swellings had they been otherwise treated. Its curative effect he attributes to its power of contracting the vessels and thus opposing an obstacle to diapedesis. We may pass by his observations on diphtheritic conjunctivitis, since the disease, though of frequent occurrence on the continent, is happily almost unknown to us. With his observations on inflammatory changes in the cornea we can cordially concur. It is only too common to meet with cases of keratitis that have, in accordance with the recommendations of many of the older treatises on ophthalmic diseases, been treated with stimulating applications of nitrate of silver, a method that was the best that could be devised to develop and intensify the very mischief it was intended to prevent and abolish. M. Wecker adopts Saemisch's division of the pathology of keratitis into the three stages of infiltration, abscess, and corneal ulcer; infiltration results from the immigration of leucocytes, and he lays down the important rule, that "infiltration is a formal indication against any irritating agent." Nothing is more remarkable to the unpractised surgeon than to see a cornea, so hazy and vascular that it is impossible to see the faintest trace of the iris through its opaque substance, as occurs in many cases of interstitial keratitis, become again bright and transparent if it have been properly treated, whilst in ophthalmic hospitals it is not seldom that cases present themselves of loss of vision from neglect of the rule laid down by M. Wecker. In such conditions warm fomentations, iodide of potassium, the instillation of atropine and at a later date the administration of tonics, are far more appropriate and are attended with far better results than the instillation of nitrate of silver, and other stimulating lotions. In the section on iritis M. Wecker recommends the practice of paracentesis of the cornea as a means of relieving pain. An excellent plan, no doubt, if the surgeon be allowed to practise it, but we fancy that a very small proportion of the better class of patients in England would submit to it. M. Wecker states that he does not indeed know of any more powerful sedative in iritis than this slight operation, "which

may be readily performed if you stand behind the patient and let him suppose you are simply going to apply a dressing." Surely there must be great danger of making a traumatic cataract in adopting this method, unless a Frenchman is much more callous than the average Englishman. The eye, it must be remembered, is exceedingly tender in iritis, and we should certainly enjoin none of our younger readers to tap the anterior chamber without fixing the eye either by the fingers or with forceps, and should prefer to employ the morphia injections which M. Wecker in the next sentence recommends. He eulogises duboisine, but this remedy does not seem to be very largely used in England. In treating of sympathetic iritis he lays down the following rule which every experienced ophthalmic surgeon will endorse: "In all cases where an eye has been the cause of sympathetic irritation, and is itself hopelessly lost, it must be removed at once in order to allow of any hopes of success in the treatment of its fellow. Any halting between two opinions as to whether some other mode of treatment would not do as well is in such a case disastrous beyond measure." In glaucoma M. Wecker recommends sclerotony, an operation that must be regarded, notwithstanding his praises of it, as still upon its trial, and to require much larger statistics in regard to its results than are at present accessible.

In conclusion, we may observe that the book is written throughout in a large and liberal spirit, and with a freedom and clearness that comes only from perfect knowledge. The mode in which it has been translated by Dr. Litton Forbes is worthy of all praise; indeed, it reads throughout like an original work.

Clinic of the Month.

On the Use of Nitro-glycerin.—Mr. Mayo Robson of Leeds states that during the last twelve months he has tried this remedy in migraine, asthma, angina pectoris, and epilepsy. In migraine, one or two drops of a one per cent. solution produces, within a few minutes, a diminution of tension in the previously corded temporal artery and relief of the pain, which in some cases does not return, but in others recurs when the physiological effects of the drug have passed off. As individuals are affected differently by nitro-glycerin, he always began with one minim of the one per cent. solution, but sometimes found it necessary to increase the dose to three or four minims to produce the desired effect. In several cases of asthma it has relieved the breathing in a most remarkable manner; the cases in which it answers are such as would be relieved by amyl-nitrite, but its effects are more marked, and the relief is more durable.

One case of severe asthma, occurring in a patient suffering from chronic renal mischief and mitral deficiency, is worth specially mentioning. He prescribed the one per cent. solution in the form of a minim to a drachm of water, and ordered two drachms to be taken every quarter of an hour till relief was obtained. His patient, however, had two large tablespoonfuls of the medicine given, instead of two teaspoonfuls. He said that the effect was wonderful ; he thought his head was going to burst, but his breathing was effectually and permanently relieved, and that instantly. In this case amyl-nitrite, although inhaled in large doses on previous occasions, had given very little relief. Since that time, several months ago, he has been threatened over and over again with his old attack, but a dose of the medicine always staves it off.

In angina pectoris, the relief given by nitro-glycerin is most complete ; and it is not simply temporary ease from pain, but, if the remedy be given thrice daily in gradually increasing doses, beginning with one minim of the one per cent. solution and steadily advancing to eight minims, the attacks lessen both in

frequency and intensity. One of Dr. Robson's patients, who has suffered severely from angina, always carries a bottle of the medicine in his pocket, and states that by taking a dose of five drops, when he is threatened with an attack, it is always prevented. Dr. Robson also hopes to find in nitro-glycerin a curative agent for epilepsy; he has not yet had an opportunity of observing its effects in a case of sea-sickness. (*The British Medical Journal*, April 10, 1880.)

Alcohol in Fever.—Prof. Macnaughton Jones has made a careful examination of the results which have been obtained after the use of alcohol in cases of typhus, typhoid, and simple continued fever. From the consideration of these results he is convinced that this substance is a most valuable therapeutic agent in both typhus and typhoid fever. A large percentage of cases, however, not only do not require the administration of alcohol, but its use is apt to lead to complication. It is impossible to lay down rules as to the stage of fever in which it may be indicated, as this indication depends rather on the type of the fever than on its stage. But the time to watch for its administration in ordinary cases is from the eighth to the twelfth day. Early administration of alcohol in fever is injudicious in the opinion of the author, who has little faith in the belief that the early employment of stimulants prevents an adynamic condition. He has rarely seen them have a good effect in the early stages of the fever of habitual drinkers, and is inclined to think that it is a dangerous fallacy to regard them as essential in such cases, for hard drinkers more often recover without stimulants than with them. Alcohol has little effect on the temperature of fever. Prof. Jones adopts as guides for the use of stimulants the age of the patients, the condition of the heart, the pulse, tongue, and head symptoms. Young patients as a rule do well without stimulants. A feeble, irregularly acting heart, with weakened first sound; a compressible and rapid pulse, a tongue keeping fairly moist, and the absence of violent head symptoms, would indicate their continuance and use. Finally, Prof. Jones believes that alcohol is a supporting food in those typhoid states where assimilation is difficult. He warns, however, against the indiscriminate use of alcohol in the earlier stages of fever, and the rash continuance and increase of the quantity used when the symptoms clearly show that it is acting injuriously, as likely to lead to the most deplorable results. (*The British Medical Journal*, May 8, 1880.)

Clinical Hæmometry.—Drs. Buchanan Baxter and Frederick Willcocks contribute some interesting contributions to the study of clinical hæmometry. From the observations which they have made, they are able to confirm Duncan's

statement as to the lack of agreement between the hypocytosis and the hypochrosis in chlorotic anæmia. The two co-exist, but their proportion to each other is variable and uncertain. This want of harmony between them is especially marked during convalescence under iron. The influence of the remedy appears to be exerted in the first place on the number of the corpuscles, whilst their functional value remains at its original level, or may even sink below it. The numerical increase proceeds very rapidly at first, and then more slowly; at this stage the corpuscles begin to grow rich in hæmoglobin. In chlorosis the normal ratio between the number of corpuscles and their functional value ceases to be maintained: whilst hypocytosis and hypochrosis co-exist, the latter is always in excess of the former. Under the influence of iron the increase in the number of corpuscles usually precedes the increase in their individual value, though both factors are affected by the remedy. The patient's symptoms are always relieved when the number of corpuscles attains its normal level, even though their individual value shows no corresponding improvement. This result might have been expected, since the addition of a certain quantity of hæmoglobin to the circulating fluid will be more useful to the organism if it be distributed amongst a larger than if it be concentrated in a smaller number of elements. The former arrangement, by offering greater facilities for the transfer of oxygen, will be the more economical of the two. (*The Lancet*, March 20, 1880.)

The Effects of Cold.—M. Colin has recently published some interesting researches on the effect of various refrigerating media upon the temperature of the skin in animals. Those exposed to the action of cold air presented different effects according to the species of the animal, and examination showed that, if the cold air lowered the temperature of the skin considerably, they rapidly died, whereas, if the cold did not effect a notable diminution in the temperature of the skin, it was well borne and even appeared to be inoffensive. After establishing this law, M. Colin confirmed it by exposing dogs and rabbits for a certain number of hours or days to the severe cold of last December. He found that the temperature even at the surface remained nearly normal. Young animals, on the contrary, placed under the same conditions, became rapidly chilled and died, although their skin was well covered with hair, a proof that the latter is only one element in the question. If the animal, instead of being placed in the open air, is enclosed in a hut of ice, it manifests a great power of resistance, and even after some hours may present a temperature almost equal to that existing at first. Placed in snow, there is considerable chilling for some

hours, followed by a strong reaction, so that after twelve hours the temperature scarcely differs from the normal, and even in the rabbit it presents a fall of only one degree. On the other hand, young animals placed in the snow die rapidly. Hence, we must assume that under these circumstances, as in the open air, the resistance to cold in the animal is due to different factors, among which the presence of a thick coat of fur is an important, but by no means the only one. (*The Lancet*, April 3, 1880.)

The Treatment of Ringworm.—Dr. Wyndham Cottle adopts the following method in the treatment of *recent* cases of ringworm of the body in infants, and on the scalp in older children. After the hair has been cropped short around the affected spots (if on the scalp) and the part well scrubbed with soft soap to insure the removal of crusts, &c., it is thoroughly soaked and rubbed, three times daily, with a solution of salicylic acid in alcohol (thirty grains in an ounce), or with benzine. The diseased hair, crusts, &c., must be cleared away as often as they are reproduced. This is generally all that is required. If any patches show a tendency to linger, they may be painted with glacial acetic acid, blistering fluid, or carbolic acid. Solutions of salicylic acid in alcohol, however, may of themselves set up considerable irritation of the skin, and may even produce a crop of pustules.

In *chronic* cases a pustular rash is formed by freely painting the tardily mending spots with the linimentum crotonis (B. P.) after washing the part with alcohol or ether to favour its penetration into the follicular orifices. This treatment is repeated until the affected spots become covered with a yellow crust, which is removed as soon as practicable by poulticing or softening with oil. In all chronic cases of ringworm suitable internal treatment should be adopted. (*The Lancet*, March 27, 1880.)

The Treatment of Cancer of the Female Generative Organs.—Prof. Clay, commenting upon several cases of cancer in which marked improvement has followed the use of chian turpentine, offers the following remarks upon this remedy. From the results obtained by the use of chian turpentine, it may be confidently stated that this substance exerts a powerful action on cancer of the female generative organs in particular. The maximum dose of the drug which can be safely and continuously given is twenty-five grains daily. It is advisable to discontinue the remedy for a few days after ten or twelve weeks' constant administration, and then to resume it as before. The turpentine is best administered simply, as the most marked and rapid effects have always been manifested when it has been given alone. The turpentine appears to act

with the greatest vigour upon the periphery of the growth, and more slowly on the whole mass. It seems to dissolve the cancer-cells, leaving the vessels to become subsequently atrophied, whilst the firmer structures gradually gain a comparatively normal condition. It is a most efficient anodyne, causing an entire cessation of pain in a few days. The chian turpentine was for the sake of convenience given in the following emulsion:—Solution of chian turpentine half an ounce; solution of tragacanth, four ounces; syrup, one ounce: flowers of sulphur, forty grains, water to sixteen ounces; one ounce three times daily. The solution of turpentine was made by dissolving one ounce of it in two ounces of pure sulphuric ether. (*The Lancet,* March 27, 1880.)

Treatment of Lupus.—Mr. Jno. Hutchinson believes that lupus is mainly a scrofulus malady; that it is influenced by the causes which induce chilblains, and that in some cases it has an alliance with psoriasis. It has no relation to syphilis. From these data the rules for treatment are easily evolved. The patient's state of nutrition is to be improved by tonics, good food, bracing air, cod-liver oil, and the judicious use of stimulants. To these arsenic, the specific for psoriasis, may usually be added with much advantage. The patient must also be protected from the influences which cause chilblains; he should therefore be sent to a warm climate in winter, or should be kept indoors as much as possible, whilst his health must not be impaired by iodides or mercury. But since the lupus growth is self-infective, it is impossible when it has once begun to arrest its spread by attention to the general health. Ulceration may perhaps be thus prevented, but nothing more. As far as the cure of the local process is concerned, it must be effected by local measures, and these measures must be of the nature of destructions. The new cell growth must be destroyed, eradicated without decay and without flinching. For this purpose Mr. Hutchinson prefers Volkmann's erasion method. If caustics however are used they must be applied freely, and a patch may often be entirely cured by a single dressing with chloride of zinc or acid nitrate of mercury. These methods give however more pain than the actual cautery, but their sores granulate better and heal more quickly. The actual cautery is comparatively painless, can be easily limited, and at the same time can be made to act more deeply. It is very efficient, but its burns are sometimes slow to heal. The erasion treatment appears to give less pain, to be very efficient, and to leave a sore which heals rapidly and soundly. Its introduction will lead to a new era in the treatment not only of lupus, but of rodent ulcer. It is so simple, so easy of employment, and has in

it so little that is alarming either to surgeon or patient, that it is likely in the future to be employed in the early stages whilst there is good hope of the complete cure of the disease. Lupus erythematosus is often benefited by solution of tar and of lead, and the full internal administration of arsenic. (*The British Medical Journal,* May 1, 1880.)

Diabetes and Sepsis.—Dr. Roser calls special attention to the occurrence of gangrenous or ulcerative processes in patients suffering from diabetes. As a rule, in cases of gangrene occurring without any definite cause, the tendency is to attribute it to some septic agency. Roser, however, points out that in these cases diabetes is often present, and, where this is the case, he states that a cure may be obtained by attention to diet, &c., without any special antiseptic measure. In support of this view, he cites a case from his own practice, of progressive gangrenous inflammation of the foot cured by anti-diabetic diet, other cases occurring in his own practice, in that of Küby, Marchal, and others. Reference is also made to cases of sudden death, which often occur in diabetic cases, and which may happen after even slight operations. He confirms Marchal's statements that in cases of obstinate furuncular eruption of carbuncles, diffuse phlegmonous inflammations, gangrene, &c., the urine should always be examined for sugar. (*The London Medical Record,* April, 1880.)

Extracts from British and Foreign Journals.

Treatment of Hæmorrhoids during the Puerperal State.—M. Chéron offers the following suggestion for the treatment of piles, which appear after delivery in gouty women who have suffered during pregnancy from great congestion and constipation. With a small syringe whose cannula is terminated by a bulbous enlargement, a tenth of a gram of the following ointment is injected into the affected parts:—

Powder of lobster's eyes	1 gram.
Hog's lard	60 grams.

After each meal one of the following pills is given:—

Powder of capsicum annuum . .	5 grams,

in twenty pills.

The spinal cord is also stimulated by friction, or by the application of a flannel compress which has been dipped in a solution of—

Chloroform	25 grams.
Alcoholate of Fioraventi . . .	150 „

(*Rev. Méd. Chirurg. des Malad. des Femmes.*)

A New Preparation of Glycerin.—Some patients absolutely decline to take cod-liver oil on the ground that it causes them to lose their appetite. In such cases recourse may be had to glycerin administered internally; this mode of employing glycerin has been too much overlooked, in spite of the excellent results which may often be obtained from it. Dr. Larmaude proposes the following formula:—

Pure glycerin	300 grams.
Tincture of iodine	30 drops.
Potassium iodide	30 cg.

A desertspoonful to be given a quarter of an hour before each

meal. The appetite is soon regained, and any constipation is quickly and completely removed. The formula may be slightly modified for delicate patients by the addition of syrup of raspberries, thus:—

Pure glycerin	250 grams.
Syrup of raspberries	30 grams.
Iodide of potassium	30 centigrams.
Tincture of iodine	30 drops.

A desertspoonful to be taken a quarter of an hour before each meal. (*Le Progrès médical*, March 20, 1880.)

The Stigmata of Maize.—It is hardly a year since this remedy was first introduced into the ordinary routine of practice, and yet it may not be uninteresting to make an abstract of some of the papers which have been published in regard to it. Prof. Castan, at the Montpellier meeting, called attention to the stigmata of maize as a remedy which he had long known, and which he had found to be of great use in gravel and nephritic colic. In the latter disease there ensued after the administration of the drug a marked decrease in the painful symptoms, and he therefore supposed that the stigmata acted less as a diuretic than as a local anæsthetic. Prof. Denucé of Bordeaux obtained the most favourable results from its use in vesical catarrh, in which it appears to possess an elective action on the mucous membrane of the bladder. Dr. Pons of Nérac, and Dr. Queirel of Marseilles, had also frequently employed the stigmata of maize. M. Queirel observed that the pain was greatly alleviated in nephritic colic after the use of the remedy, but the urine was at the same time markedly increased in quantity. At the Therapeutic Society, M. Constantin Paul stated that he was not convinced of the diuretic properties of the stigmata, although one of his colleagues had obtained some very striking results, the quantity of urine being in one case of dropsy increased from 500 to 1,500 grams after the ingestion of three spoonfuls of the syrup. Dr. Landrieux has arrived at the following conclusions based on a considerable number of observations. (1) The various preparations of the stigmata of maize are of use in modifying the secretions of the urinary tracts. They may also be considered to possess a distinctly diuretic action. (2) The diuresis is rapidly produced, and the increase of urine is very marked after three or four days. (3) The diuretic effects are observed, not only in diseases of the organs concerned in the urinary secretion, but also in affections of the vascular system (diseases of the heart, blood-vessels, &c.) (4) The pulse is regular, the arterial tension is increased, whilst the venous pressure is diminished. (5) The

remedy produces no disturbance of the nervous or digestive systems. The tolerance of the drug is complete and absolute, whilst in chronic cases its administration may be continued for three to six months without inconvenience. The different results which the use of the stigmata of maize has given at the hands of different observers, appears to be due in large measure to the fact that the strength of the extract varies, according to the nature of the soil, to the climate, to the time, to the mode of picking, and to the manner of drying the stigmate. The formula for the preparation of the syrup is not yet fixed, since the quantity of the active principle varies in different samples of the stigmata. The *Pharmaceutical Union* adopts formulæ which contain in one case six, and in another twelve grams of extract to the kilogram of syrup. The latter receipt is based on the assumption of a strength of 12 per cent. This quantity appears, however, to be too small, since the best samples of stigmata yield 25 to 30 per cent. of extract, or on an average, 27·5 per cent. The kilogram of syrup will therefore contain 27·5 grams with this strength (27·5 pro mille). The daily dose of the syrup will be two to four spoonfuls, representing about one to two grams of the extract. In all cases the syrup should be used in preference to an infusion of the stigmata of maize. (*Le Progrès médical*, February 14, 1880.)

Therapeutic Effects of Iron, Condurango, and Sulphate of Zinc administered subcutaneously.—M. L. Wyschinski has tried at the clinic of Prof. Laschkewitsch, at Charkhow, a number of new remedies, and has communicated in a paper to the medical society in that town the results at which he has arrived. *Subcutaneous Injection of Iron.*—Prof. Huguenin employed the citro-ammonical pyro-phosphate of iron in an aqueous solution containing a little albumin to diminish the local irritation. A dose containing three grains of the medicine was injected hypodermically. In general everything went well, but in two or three cases a small abscess formed in the neighbourhood. The effect was extremely satisfactory. A patient with carcinoma of the stomach, who was so feeble that he could not leave his bed, was able to rise and walk about after three or four injections. Another patient with anæmia from hæmatemesis due to a simple ulcer of the stomach gained 3·5 livres after six injections. In a case of cardiac anasarca, three injections sufficed to increase the quantity of urine and to diminish the œdema. In an anæmic patient who had hysterical fits, the attacks diminished in number and intensity five days after the injections were commenced. In all the cases there was an increase of strength and an improvement in general health.

Bark of Condurango.—The author gives the results he has obtained in six cases of carcinoma (two of the œsophagus, and four of the stomach). In one case the vomiting and pain disappeared, in another there was no change, whilst in the other four there was a marked improvement. *Sulphate of Zinc* has been employed for the last three or four years at the clinic of Laschkewitsch in doses of 0·25 grain in a convenient solution. Where the pain of injection was severe, 0·5 of a grain of codeia was given at the same time. The author has seen this treatment applied in a number of cases, but he insists particularly upon the case of a young man of sixteen years of age, who since his tenth year had suffered from anorexia, eructation, and vomiting. For five months previously he had vomited after each meal, at an interval varying from ten minutes to an hour. The feebleness and emaciation were extreme. There was slight dilatation of the stomach. Ten days after the treatment was begun the vomiting became less frequent and violent; the appetite revived at the end of five or six days more, and in a short time the patient was able to leave the hospital. This remedy renders equal service in carcinoma of the stomach by acting upon the concomitant catarrh. The author thinks that its effects are not due to its astringent properties, but rather to an influence which it exerts upon the pneumogastric nerve. (*The Glasgow Medical Journal,* January, 1880.)

Hæmorrhoids.—M. Duret has arrived at the following conclusions in regard to the pathogeny of piles. Hæmorrhoids are varicose dilatations of the recto-anal branches of the portal vein, due in the large majority of cases to the four following causes:—(1.) A mechanical obstruction to the circulation in the abdominal vein. This is in a large number of cases due to anatomical lesions of the abdominal viscera, particularly of the liver and spleen. When the affection is caused by such lesions, a cure may often be effected by treatment of the abdominal disease. (2.) Constant physiological troubles leading to an increased tension in the vena portæ and its branches. The phenomena of exertion might give rise to such troubles. (3.) Contraction of the sphincter, due to the irritation of the sensory nerves supplying the mucous membrane of the anus (anal fissures, ulceration, and polypoid venous growths stimulating the mucous membrane). In such cases the external sphincter should be dilated. (4.) In long-standing hæmorrhoids, true cavernous tumours are formed which can only be effectually treated by operative measures. M. Duret alludes briefly to well-known methods of treatment. He places great reliance upon cold rectal applications, repeated several times a day, for he believes that

such applications strengthen the contractile power of the levator ani, a muscle which is antagonistic to the action of the sphincter, whose abnormal contraction may be advantageously combated by this means. Attention should also be paid to the treatment of constitutional symptoms, rheumatism, gout, and particularly anything which gives rise to hepatic or splenic congestion. (*Arch. gén. de Méd.*, Feb. 1880.)

The Influence of Cold Baths upon the Composition of the Urine.—MM. Lépine and Flavard read a communication before the Société de Biologie of Paris in regard to the influence of a very cold bath upon the composition of the renal secretion. After alluding to the experiments made by Hoppe-Seyler in regard to this point, M. Lépine gave a detailed account of the results arrived at from his investigations upon a dog. After a starvation period of eight days, a dog weighing 11 to 12 kilos. excreted upon an average 1·4 gr. of nitrogen and 0·6 grams of phosphoric acid in twenty-four hours. The animal was then plunged on two different occasions in a bath whose temperature was 4° C. for a period of fifteen minutes. At the commencement of the experiment the temperature, as taken per rectum, was 39°; after the first bath the rectal temperature was 36°, and after the second it had fallen to 33°. When taken from the bath the dog passed a little pale and slightly albuminous urine containing 0·26 grams of nitrogen and 0·029 grams of phosphoric acid, or a smaller quantity of phosphoric acid than the average of the preceding days. On the next and succeeding days an excess of phosphoric acid was eliminated, whilst the nitrogen on an average amounted to 4·9 grams per diem. On another occasion the same dog with a rectal temperature of 38° was plunged as before into a bath at 2° C. After the first bath the thermometer marked 35°, and a quarter of an hour later 32·5°. Immediately after the second bath, the thermometer in the rectum marked 32·5°, and a quarter of an hour later 29·3°, after which the temperature slowly rose. At the conclusion of the experiment the urine contained 1·15 grams of albumin. From these observations MM. Lépine and Flavard conclude that a bath of very low temperature causes, at least in dogs, a marked increase in the quantity of nitrogen excreted by the urine, whilst the phosphoric acid is also increased, but to a smaller extent. For the well-fed and well-clothed human subject the converse is true, since the phosphoric acid of the urine is greatly increased, whilst the amount of nitrogen is increased but to a smaller extent. (*Le Progrès médical*, Feb. 21, 1880.)

Treatment of Pertussis by Inhalation.—Dr. Lewis Smith has successfully treated several cases of whooping cough by the

spray of the following mixture, which was inhaled from a steam atomiser three times daily for from two to five minutes at each sitting.

℞ Acid carbolic, ʒ ss.
Potass. chlorat. ʒ ij.
Glycerinæ, ℥ ij.
Aquæ, ℥ vj. Misce.

Whilst seeking to ameliorate the cough sustaining measures must not be omitted, both in the spasmodic stage and during convalescence. Beef-tea, wine, and iron are very useful given in teaspoonful doses every two hours to a child of two years. (*The American Journal of Med. Science*, October, 1879.)

Apomorphia in Sunstroke.—Drs. Tomlinson and Murphy call attention to the value of hydrochlorate of apomorphia in the treatment of cases of sunstroke. In three very severe cases the drug was administered as soon as possible after the admission of the patient to the hospital, $\frac{1}{16}$ grain being sufficient to produce the desired emesis in two of the cases. The results of the injection of this quantity caused vomiting in less than ten minutes; in no case was there any distressing nausea, but apparently an almost instantaneous evacuation of the contents of the stomach. The temperature was reduced, the pupils became widely dilated, whilst sensation and movement returned within half an hour. The skin became slightly moist and the patient regained consciousness by slow degrees. In each of the cases there was complete insensibility, eyes fixed, pupils contracted to a pin's head and insensible to light, pulse very full and rapid, breathing shallow, stertorous, and accompanied by moaning; temperature very high (reaching 109° in one case), and also involuntary evacuation of the bowels. (*The India Medical Gazette*, Nov. 1, 1879.)

Experimental Albuminuria.—In a paper read before the Société de Biologie in Paris, M. Rabuteau put forward some general ideas in regard to the subject of albuminuria. The facts were obtained from experiments recently performed by the author, who admits three chief forms of albuminuria. In the first type the albumin appears after some local injury to the kidneys which causes the tubuli to lose their epithelium. This form of albuminuria is observed in cases of colchicum poisoning, and after the administration of certain iodates, such as the ammonium or magnesium iodate, though it does not appear after the ingestion of the iodates of sodium and potassium. This phenomenon is due, according to M. Rabuteau, to the fact that iodate of ammonium is partially transformed in the organism into iodide, and that the mixture of these two salts causes

desquamation of the tubuli uriniferi. The second form of albuminuria occurs in cases of intoxication produced by the amylic and propylic alcohols. The urine in such cases is red, but it contains no blood-corpuscles. M. Rabuteau believes that the albuminous substance of the corpuscles passes into the urine, and he therefore proposes to designate this form of albuminuria by the term "globulinuria." The third variety of albuminuria is produced by disturbance of the functions of general nutrition. It occurs in animals intoxicated with the salts of various minerals, such as cadmium, gold, platinum, zinc, palladium. The albumin in such cases only appears in the urine when the kidneys present fatty granulations. In this last type the albuminuria is consequently produced during the elimination of the poisonous substance. (*Le Progrès médical*, March 13, 1880.)

Localisation of Arsenic.—The investigations of M. Scolosuboff upon the localisation of arsenic in the organs, has led him to conclude that it condenses first of all in the brain. Experiments have recently been made by MM. de Poncy and Livon, which have resulted in confirming the observations of Scolosuboff. MM. de Poncy and Livon have also observed that when small doses of arsenious acid are given to an animal daily with the food, the phosphoric acid in the urine is considerably increased. The authors consider that this increase could have come from substitution only, and not from any pathological condition of the animal; for in cerebral affections they have found rather a diminution than an increase of phosphoric acid in the urine. The arsenic then seems to replace the phosphorus of the phosphoro-glyceric acid, producing arsenio-glyceric acid. The authors are attempting to isolate this base. The experiments are described in detail, and show care in their performance. E. Ludwig, however, has made analyses of the organs of persons who had committed suicide with arsenic, and of dogs which had died, some from acute, others from chronic poisoning, and in all cases he has found the greatest quantity of arsenic collected in the liver. In acute poisoning, the kidneys also were rich in arsenic, while the bones and brain contained only very small quantities. In cases of chronic arsenical poisoning in dogs which were not fatal, and in which the administration of the poison was stopped, he found that the poison remained longest in the liver, whilst it was eliminated from the other organs at a much earlier period. (*The Boston Medical and Surgical Journal*, Feb. 5, 1880.)

Localisation of Strychnia.—MM. Lajoux and Grandval have presented to the Pharmaceutical Society of Paris an interesting communication concerning this question. According to some authors (Husemann, Dragendorff), the chemist in cases

of poisoning by strychnia should direct his investigations chiefly to the liver. Dragendorff states that he has never succeeded in isolating the alkaloid from the brain, even when the whole organ was operated upon. He states that Gay however has been able to isolate it from some special parts of the nervous system, such as the medulla oblongata and pons varolii, and that he himself has been able to discover it in the former situation. Lajoux and Grandval present the results of their analyses of the brain of a person who died from the effects of 2·35 grams tr. nux vomica, equivalent to only 0·0035 grams of strychnia. Of this amount about three quarters was administered hypodermically, the rest by the mouth. Although the quantity was very small, they succeeded in isolating the strychnia from only a fraction of the brain, and obtaining its characteristic tests. If these observations prove correct, the chemist should never neglect, in cases of poisoning by strychnia, to examine the brain. (*Ibid.*)

On the Action and Composition of Jaborandi.—The local application of nitrate of pilocarpin to the conjunctiva produces myosis of the bulb and spasm of the accommodation mechanism. Prof. Albertoni, from experiments which he has made, states that in man the myosis produced by the instillation of a one per cent. aqueous solution of pure pilocarpin disappears after a period of 1 to 2 hours, being followed by mydriasis, which is the more marked, and which may last from 20 to 40 or 60 hours, according to the quantity of the solution which has been absorbed. Similar results were observed in dogs, the myosis being of much longer duration, and of greater intensity after section of the sympathetic. In cats, similar results were observed, occurring after a longer interval. In rabbits, contraction of the pupil was not so well marked, and there was no subsequent mydriasis. When the sympathetic nerve supply of the iris had been cut off, the mydriasis occurring after instillation of pure pilocarpin was no longer observed; the myosis, however, was more marked; the results could not therefore be due to paralysis of the sympathetic. The phenomena were not due to paralysis of the third nerve, since the myotic action of the jaborandi was manifested to its full extent after the eye had been deprived of cerebral influences by section of these nerves. The same result occurs in man under pathological conditions. Dr. Albertoni is inclined to account for the myosis, by supposing that it is due either to the action of the intra-ocular fibres of the third nerve; to an intra-ocular ganglionic centre; or to the direct action of the drug upon the muscle fibres. In pure pilocarpin, Dr. Albertoni distinguishes a myotic and a mydriatic principle. The mydriatic principle is wanting in the salts of pilocarpin and in many kinds

of jaborandi, as for instance, in the jaborandi leaves of Dr. Coutinho. (*Arch. f. exp. Pathol.* xi. p. 415; *Centralbl. f. die Wiss. med.*, Feb. 21, 1880.)

The Treatment of Intermittent Fever by Pilocarpin.—Dr. H. Rokitanski, in the *Med. Jahrbücher*, 1879, and Dr. Gaspard Griswold, in the *New York Med. Record*, 10th August, 1879, record some excellent results obtained by the employment of pilocarpin in intermittent fever. The former, for example, narrates a case in which the fourth attack of ague was cut short almost at once by an injection of about $\frac{1}{3}$ gr. of pilocarpin, the previous attacks having continued, in spite of the usual treatment, for many months. "These results having been questioned," says Professor Picot, Bordeaux, "I have carried on a similar investigation in my hospital practice. The results seem to me so remarkable that I have thought it right to publish them, although the observations are few in number. I have come to the conclusion that the nitrate of pilocarpin is a febrifuge of extreme power, a small dose, 1 centigram to 15 milligrams (about 1-7th to 1-5th grain), preventing the febrile accession, and very often cutting short the attack of ague itself, reducing at the same time the volume of the spleen." Professor Picot gives the four cases on which he has based the above opinion, the first of which may be shortly noted as an example. Patient was a well-developed, though decidedly anæmic man, æt. 47. Since 23rd August last he had been suffering from a distinctly marked quotidian ague which, notwithstanding the vigorous use of emetics, cathartics, and quinine, continued until his admission on the 28th October. On the following day, after the administration of a purgative, 1 centigram (about 1-7th gr.) of nitrate of pilocarpin was injected under the skin of the fore-arm. In two minutes salivation had set in, and the patient was covered with perspiration. Fully 12 ounces of saliva were secreted. In an hour and a half salivation and sweating ceased; no fever, and the patient perfectly calm. There was no return of the fever, and only the anæmia remained for further treatment. On the 10th November patient was dismissed well, and able to resume his usual employment. (*Journal de Thérapeutique*, Nov. 25, 1879; *The Glasgow Med. Journal*, Feb. 1880.)

Notes and Queries.

Genoveva Water.—We have received from Messrs. Lamb and Co. a specimen of this water. It contains chiefly alkalies and earthy bicarbonates, with small quantities of sulphates and chlorides, and of silicic acid, a very little protoxide of iron, and traces of rubidium, cæsium, and borax. It contains a large quantity of carbonic acid, and is one of the pleasantest table waters which we have ever tasted. Its taste is so agreeable that we have no doubt it will come largely into use.

Fellowes' Syrup of Hypophosphites.—This preparation, which we have received from Mr. Burroughs, is composed of the hypophosphites of iron, quinine, strychnine, manganese, lime and potash. Each drachm contains a proportion of hypophosphite of strychnia equal to one sixty-fourth of a grain of the pure alkaloid. The difference in action between the phosphates and the hypophosphites has been recognised by the introduction of hypophosphites into the British Pharmacopœia, and this preparation is intended to present the tonic and nutritive bases which it contains in the form of hypophosphites so as to increase the medicinal powers which they would have even in the form of phosphates.

Bishop's Effervescent Extract of Nux Vomica.—We have also received this preparation from Mr. Burroughs. Nux vomica is well known as a most efficient tonic, and it is sometimes also exceedingly useful in cases of nervous headache, when taken frequently during the attack. In the present preparation the bitterness of the nux vomica is rendered less unpleasant by its administration in the effervescent form. Each drachm contains one-twelfth of a grain of nux vomica, and the measure supplied with the bottle renders it very easy to administer the required dose.

Fry's Malted Chocolate Paste.—This is a combination of chocolate with malt, prepared by Messrs. Allen and Hanbury. It is intended for the use of persons suffering from pulmonary affections, debility, imperfect nutrition, or deficient lactation. It can be readily taken by persons who are unable to use ale, stout, or other malt liquor. It is exceedingly pleasant to take, and as the extract of malt is prepared at a low temperature by evaporation *in vacuo* we have no doubt that the malt

retains all its diastatic properties unimpaired. In using this, however, care should be taken that the water employed is not too hot to destroy the ferment.

Ems Water.—The mineral waters of Ems have long been known and much resorted to for their beneficial action in disorders of the digestion, gout, rheumatism, and affections of the throat and bronchi. No doubt the water is more efficacious when drunk at the spring, as its action is aided by conditions of exercise and food which the patient is hardly likely to have at home. Those who are unable to visit the spring, however, may obtain the waters in several forms, specimens of which have been sent to us by the London agent, Mr. Massingham. First of all, we have the Ems water simply bottled, and this may be used for the affections above named, or even as an ordinary beverage at table, as its taste is very pleasant.

Ems Natural Mineral Salt.—This is a strong solution obtained by evaporating the natural waters to one-twentieth of their bulk, and may be used for strengthening the ordinary Ems water either for inhalations, gargles, or for drinking in cases where the water itself is not sufficiently strong.

Ems Pastilles.—These are prepared by evaporating the mineral waters to dryness, and making up the resulting salts into the form of lozenges. We have inspected the preparation of these pastilles in all its stages in the manufactory at Ems, and satisfied ourselves that the method of manufacture is thoroughly good. They are intended for use in catarrh of the stomach, intestines, and bronchi; in gout, scrofula, and hæmorrhoids. They contain the bicarbonates of soda and lithia, the carbonates of lime, strontium, barium, magnesium, iron, and manganese; the sulphates of soda and potassium; the chloride, bromide, iodide, and phosphate of sodium; phosphate of alumina and silica, made up with sugar into a form that is pleasant and agreeable to the taste.

Condy's Concentrated Oxygenated Mineral Water of Ems.—This apparently consists of concentrated mineral Ems water, mixed with permanganate of potash, and may be used for the same purposes as the Ems water alone. The inventor supposes that its efficacy will be increased by the oxygen which it contains.

[Owing to press of matter the Bibliography is deferred until next month.—Ed. Pract.]

Department of Public Health.

THE REPORT OF THE MEDICAL OFFICER OF THE LOCAL GOVERNMENT BOARD.[1]

At length the long-delayed report of the Medical Officer of the Local Government Board for the year 1878 has been issued. The protracted illness of Dr. Seaton (an illness which ended fatally at the beginning of the present year) was the occasion of the delay; and the present report, which refers to the work done in the Medical Department of the Local Government Board during the last year of Dr. Seaton's active supervision of the Department, is signed by Dr. Buchanan as "Assistant Medical Officer," the post he held under Dr. Seaton. Dr. Buchanan succeeded Dr. Seaton as Medical Officer of the Board, and the report is from his pen.

The report first describes the proceedings of the Medical Department in respect to public vaccination, and shows a progressive improvement in the results obtained by the present arrangements as regards both the efficiency and quality of vaccination. It shows also an inferior degree of success in the metropolis as compared with other parts of the kingdom—an inferiority which has an important bearing upon the recent prevalences of small-pox there. It does not clearly appear in what manner the metropolitan shortcomings in public vaccination originate, but the subject is now under investigation by the Department. The work of the National Vaccine Establishment is also described, and it seems that charges of lymph, amounting to no less than 37,090 capillary tubes, points, and squares of glass, were issued during the year to 9,590 applicants, 8,543 being public vaccinators and private medical practitioners in England,

[1] *Eighth Annual Report of the Local Government Board*, 1878-79.—*Supplement containing the Report of the Medical Officer for* 1878.

Wales, and Scotland. Complaint of an untoward result from the use of the large quantity of lymph thus issued was made in six cases only, and each case was specially investigated, as is the custom of the Medical Department, with the result of showing that the untowardness could not certainly, or even probably, be assigned to the lymph. No hint of a case of syphilitic disease connected with vaccination was heard from any one of the 9,590 medical practitioners to whom lymph was supplied.

The report next enters into some considerations respecting *animal vaccination*. During 1878 the Medical Department gave regard to this subject in two aspects, namely, pathological and administrative. In the pathological aspect Dr. Klein, under the supervision of the Medical Officer, Dr. Burdon Sanderson, and Mr. Ceely of Aylesbury, was instructed to make certain experiments with a view to settle a disputed point in the pathology of vaccinia, namely, whether or not it can be produced in bovine animals by inoculation of them with the lymph of human small-pox. At the end of the year Dr. Klein had operated by inoculation on sixteen heifers and fifteen milch cows without obtaining any affirmative result. Further experiments, however, were to be made, and for the present it is not proposed to publish the details of the observations. The Medical Officer's observations on the administrative aspect of animal vaccination are so important that we quote them:

"The Medical Officer in person made inquiry, during the autumn of 1878, into the use of vaccine lymph cultivated upon calves and employed in human vaccination at certain stations on the Continent. From a memorandum which he prepared, but which is not a complete report on the subject, it appears that the difficulties which had at first been encountered in the transmission from animal to animal of lymph derived in the first instance from a natural source of cow-pox had practically ceased. Dr. Seaton was able to observe a considerable number of children upon whom vaccination had been performed with lymph taken direct from the calf after long transmission through the calf system, and he says of them that their vesicles were neither more nor less complete, though somewhat smaller in size, than the vesicles produced by like methods of operating with humanised lymph at the public vaccination stations of England. The chief difference between the two lymphs was in the degree of certainty with which a desired result could be produced. In the hands of an experienced operator with fresh *humanised* lymph in England, 2,996 children out of 3,000 were successfully vaccinated at the first attempt; and failure to produce a vesicle where it was intended to produce a vesicle occurred so rarely that, with a fair approach to certainty, every child obtained the whole result which the operation was intended to produce. On the other hand, according to Dr. Seaton's observations at Amsterdam and the Hague,

vaccination done by very experienced operators, but with fresh *animal* lymph, showed two total failures out of 91 operations, and 20 cases out of the 91 where the number of vesicles had been less than half the number that the operator had endeavoured to produce. At Rotterdam complete success had been attained in only some 54 per cent. of children operated on. At Berlin 7 per cent. of total failures were recorded; and of the successful operations, complete success had been attained in much less than half of the children operated on. These failures to obtain complete results had in Berlin led to a large proportion of the children receiving an imperfect degree of protection against small-pox, and at Amsterdam and the Hague had led to the practice of making a much larger number of insertions than were regarded as necessary for protection against small-pox, merely because the operator expected that some of the insertions would fail.[1]

"The following paragraphs from Dr. Seaton's memorandum bring into relief certain considerations that are often overlooked by those who have not studied the working of the English system, and who believe that England has only to follow the experience of Belgium to exchange her own excellent system for a better:—

"'Any one who is familiar with the practice of public vaccination in England will at once see the difficulties which would be met with in inducing parents first to allow their children to be submitted to 10 punctures, instead of the 4, 5, or 6 which are usually employed in this country, and which under the use of the current lymph are quite sufficient to secure the number of vesicles desired, and secondly, to allow the performance in a considerable number of the cases, of a second vaccination at the end of the day week, even supposing that this second vaccination could be relied on to make good what had been wanting in the first. It was the great object, steadily held in view, in the re-organisation of the public arrangements for vaccination in England, that these should be such as would make the single performance of the operation as completely successful as in the nature of things a single infantine vaccination can be.' . . .

"'From these notes respecting the success of animal vaccination in those countries of Europe in which I was able to inspect it on the present occasion, it will be seen how considerably inferior are its merits for effectually producing at once the needful protection against small-pox to that of the system at present in use in England. The substitution of certainty for uncertainty of success in the performance of vaccination was the great purpose of the re-organisation of vaccination arrangements which took place in England, in consequence of the official inquiry in 1859–64, into the then state of vaccination in this country—a re-organisation which had been and is working with the most satisfactory results. To admit into our system, and stamp with the sanction of Government as one of equal value, a plan to which the main objection is its uncertainty, would seem to me to be indeed an inconsistent and a retrograde step.' . . .

"'The practice of vaccination in Belgium does not, as might have been supposed from the statements often made, afford to the observer much opportunity of seeing for himself the direct action of animal lymph on the human subject, and of noting for himself its relative degree of success. Vaccination from the calf to the human subject was practised many years ago at Brussels at the Institut Vaccinal de l'État, as stated by me in my report for 1869 [12th Report of Medical

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[1] In this paragraph, vaccination with *absolutely fresh* lymph is alone spoken of. At Berlin, record had been kept (*Klin. Wochenschr.* 1878, No. 16), of the result of vaccinations with animal lymph that had been stored. Of such vaccinations, 18 out of 60, or 30 per cent., had been unsuccessful.

Officer of Privy Council]; but this has long been discontinued, and the vaccination generally in the kingdom is carried on by vaccinators, public and private, from arm to arm. It is absurd therefore to speak as is sometimes done of vaccination from the calf to the arm as the Belgian National System.'

"Thus the Department, in its concern with vaccination during 1878, was not content to know that the established arm-to-arm system was working extremely well and always with some improvement, but it was desirous of getting such information as it could obtain respecting the specialities and actual working of animal vaccination. The Department proposes, as occasion serves, to continue its researches in this direction. Opportunity for observing vaccinia in animals and the results of calf-vaccination on the human subject are not largely to be met with in England, and special arrangements for the further study of the subject in its various aspects may probably prove to be desirable. Meanwhile private establishments for the vaccination of children with animal lymph (if they should grow in this country, as they have grown in other countries, owing to some general demand for such lymph), can afford some of the opportunities of which the Department is in search."

Following the remarks on vaccination are certain observations on the reports of Medical Officers of Health, to a critical reading of which much time is given by the Medical Department, and from which it would appear "that officers of health and the authorities whom they serve are alike becoming more appreciative of their sanitary functions." One only of the reports of the inspectors of the Department into local prevalences of disease is given in this report of the Medical Officer, namely, Mr. W. H. Power's report on a strange and fatal skin disease among infants, at Loughton in Essex, that proved to be due to the presence of arsenic in "violet powder" used for nursery purposes. This report has been for some time before the profession, and need not occupy our attention.

The chief bulk of the report and its principal feature consists of the third and concluding portion of Dr. Ballard's report of the results of his inquiry concerning Effluvium Nuisances—an inquiry upon which he has been engaged since 1875. This report will require separate consideration, and we would simply observe here that the inquiry has been singularly successful in its practical sanitary aspects.

With regard to foreign epidemics, so far as they come within the province of the Local Government Board, the Medical Officer gives some interesting information as to an extension of cholera in Arabia in 1877-78.

Of the Medical Officer's report generally, it may be said that it fully sustains the reputation of the Medical Department.

ON AN OUTBREAK OF FEVER THAT PROVED TO BE TRICHINOSIS ON BOARD A REFORMATORY SCHOOL SHIP.

BY MR. W. H. POWER,

Of the Medical Department of the Local Government Board.

(*Continued from* p. 400.)

It will be observed that this study of the clinical records of the cases, though it failed to elicit information directly suggestive of trichinosis, failed to a like degree to support a theory of enteric fever. Attempt was therefore now made, in conjunction with the medical officer of the ship, to recover by inquiry of the boys themselves and of their attendants more extended particulars of the clinical history of the cases attacked. By this means, and with the help of leading questions, it was ascertained that if the outbreak had been one of trichinosis, certain symptoms, usually described as characteristic of that disease, had not been prominent. Notably "sudden swelling of the face, particularly of the eyelids, at an early stage of illness," had not, except perhaps in one or two instances, been noticed. No obvious "painfulness and immobility of the arms and legs with œdema and contraction of the muscles" could, except doubtfully in a single instance, be heard of. Again "œdema of the feet, legs, and thighs toward a later stage of illness" had not, except in one case, existed. General "anasarca of the trunk" had been altogether absent. But nevertheless it became apparent that though in no single instance had all the symptoms referable to trichinosis been present, still in several cases one or more symptoms that might have belonged to that disease had existed, and in other cases such symptoms seemed obscurely hinted at. Further, in some half dozen instances, there had been jaundice of an anomalous sort. Upon the whole it did not seem that trichinosis could, from this clinical history, be set aside; though evidence affirmative of it was, thus far, wanting. On the other hand, these new details left me unconvinced that the outbreak had been enteric fever, and this,

notwithstanding the occurrence, in certain cases, of symptoms more or less diagnostic of that disease. As the questioning of the boys and the ship's staff proceeded, it became, indeed, increasingly evident that a large proportion of the fever cases might be more safely ranged under some general name, such as "simple continued fever," than under the specific name of enteric fever; and it was observed, too, of the less febrile cases that they, like the more febrile, were accompanied by pain in the belly and nausea, with, though commonly without, looseness of the bowels. In taking this view of the outbreak, I found myself in much accord with the medical officer of the ship, who, except for some few cases, would from the beginning have been disposed to avoid a name that implied a certain knowledge of the pathology of the disease.

It was now, upon reaching this point, that it came to be pretty clearly seen that an outbreak, characterised as this one was in the bulk of its cases, by "simple continued fever" with gastero-enteric disturbance, might just as well have been related to trichinosis as to enteric fever; the fact of certain of the graver cases of the outbreak, taken collectively, presenting most of the symptoms characteristic of enteric fever, seeming to lose significance beside the circumstance that these very same cases presented, collectively, many symptoms that might be referable to trichinosis. So that, at this stage of inquiry it had become obvious that need for *direct* evidence respecting the nature of the outbreak had become imperative, and in this sense I reported to the Medical Officer of the Board.

Two methods were indicated whereby direct evidence might be brought to bear on the subject of inquiry. One, microscopical search for trichinæ in portions of muscle excised from patients who had recovered; the other, exhumation and pathological examination of the body of the single fatal case of the outbreak. The former course did not commend itself; for microscopical examination of living muscle is practicable only within somewhat narrow limits, and failure to find trichinæ by this method, while not necessarily disproving trichinosis, would in no sense afford evidence of enteric fever. On the other hand, exhumation and pathological examination of the body (with the large facilities thus procured for microscopic

examination of muscles) of the boy who died might be trusted (if decomposition had not too far advanced) to decide between trichinosis and enteric fever. Further, this course had the additional advantage of dealing with what was in effect a test-case of the outbreak. The case in question was that of the boy Pierce, who was one of the first group of sufferers attacked on September 23rd. He in particular exhibited symptoms (persistent diarrhœa, copious eruption of rose-spots, and even free hæmorrhage from the bowels) believed at the time to be those of enteric fever. In addition, he, in dying on the eighteenth day of his illness, appeared to be the subject of bowel perforation.

Application was therefore made by the Board to the Home Office for an order for exhumation of the body of Pierce. An order being granted conditionally on consent of the friends of the boy being first obtained, and on the understanding that the exhumation and necessary re-interment of the body should be carried out under the auspices of the sanitary authority of the district in which burial had occurred, I set myself to procure this consent and to make the requisite arrangements. This having been done, the examination of the body took place on the 6th December. With the consent of the Board, Dr. Cory (who had previously assisted in microscopic examination of the pork) was associated with me at the necropsy and in the pathological investigations which followed.

It was hardly expected that post-mortem examination of the ordinary kind would, two months after burial, afford much information. It was thought that detailed pathological examination of certain viscera and tissues would be needed before a conclusion could be arrived at. At the necropsy, however, it was found that decay had not so far advanced as to obscure certain first indications which, while they did not point to trichinosis, went far to negative the notion of enteric fever. The body, though much decomposed externally, fairly retained its normal proportions. There was no œdema of the feet, limbs, or trunk. Internally the effects of decomposition were less manifest; the various viscera were easily made out, and so far as naked-eye appearances went, were not much changed. Beyond enlargement of the spleen, which was double the normal

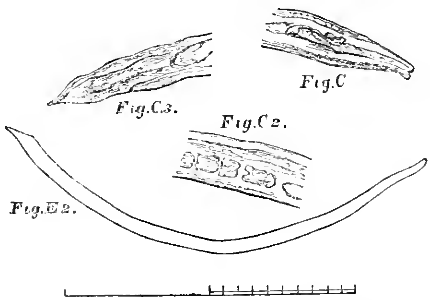
size, there was nothing suggestive of enteric fever. There was no peritonitis, nor any evidence of perforation. The peritoneum generally was clear, shining, and free from lymph or adhesions. No enlargement of the mesenteric glands could be discovered. The stomach, intestines, some of the other viscera, and portions of various muscles were reserved for further and more exact examination.

Further examination was carried out conjointly by Dr. Cory and myself. I think it right to put on record minute technical details respecting this examination, for the use of future inquirers. First, as to enteric fever. Very careful examination of the stomach and intestines failed to find any trace of ulceration, or (allowing for decomposition) of any change in the intestinal glands such as is usual in enteric fever. Moreover, the bowels, as tested by water, proved throughout intact. In a few places the bowel was discoloured internally, as if by injection of the mucous membrane subsequently altered by decomposition; but there was no appearance among the decomposed bowel contents of the presence of blood in any considerable quantity. More thorough examination of the mesenteric glands than had before been practicable revealed a few only enlarged, and none were bigger than peas. The other organs afforded no evidence for or against enteric fever. It thus appeared, after detailed examination of the viscera habitually implicated in enteric fever, as had appeared from the original necropsy, that with all allowance for decomposition, no such anatomical changes as are characteristic of enteric fever toward the end of the third week of its duration were to be found; and the conclusion now seemed warranted that whatever had been the nature of this boy's fatal illness, it certainly had not been enteric fever.

This conclusion was more than confirmed by the results of microscopic investigation, conducted with reference to trichinosis. In the very first specimen examined, a few fibres from one of the abdominal muscles, was found a *wandering and living trichina;* and further search revealed the presence of these parasites in most of the muscles examined.[1] Although

[1] No trichinæ were discovered in the heart. This organ was found to be small, its walls thin and flabby, and its muscles more decomposed than any examined.

tolerably abundant, the trichinæ could not be said to "infest" (in the common sense of the word) any of the muscles, except perhaps the diaphragm, and in none of them had the parasite reached the stage of encapsulation. Except the first found, no trichinæ exhibited active movement, and comparatively few had attained, as had that one, their full growth as muscular parasites. In specimens of this sort the internal structure and organisation were under a high power ($\frac{1}{12}$) readily made out, the parasites having altogether resisted decomposition, and most of them having probably died only a short time before examination. The smaller, not fully grown, muscular trichinæ, on the other



Trichinæ magnified. For full description *vide* p. 480.
Scale : The smallest divisions represent thousandths of an inch, the whole scale therefore represents one-thirtieth of an inch.

hand, had seemingly all long since died. Their outline had become indistinct, their interior granular, and their structure could not be made out. Many were found broken up. Examination of the decomposing contents of the small intestine failed to find any parent trichinæ, but by scraping the under surface of the folds of mucous membrane of the bowel brood trichinæ in considerable numbers were obtained. These had apparently all died, and their structure could not satisfactorily be made out.

Doubt could no longer exist that this boy died from acute trichinosis. Not only was the presence in his body of the actual parasite demonstrated, but the results of microscopic

Possibly during life the heart had been severely trichinised (seeing that brood parasites, if conveyed by the venous blood, would encounter it first of all the muscles), though subsequently the parasites had migrated from it. Encapsuled trichinæ in the cardiac muscles are almost unknown.

examination pointed to the parasites as having played a very active part in the production of his illness, and were indeed precisely such as might have been anticipated in a case of early death from trichina disease. Death took place in this instance on the eighteenth day after appearance of symptoms, at a period that is too short to have allowed of any excessive migration of brood trichinæ, and insufficient also for the attainment of full growth in the muscles of any but early migrants. At the same time the period was not nearly long enough to have sufficed for the full evolution and encapsulation of many (if, indeed, of any) muscular parasites.[1]

Demonstration such as this of the nature of the fatal illness in what has been termed a test-case of the outbreak was in effect demonstration of the nature of the outbreak itself. It will be remembered that the evidence adduced indicated that the cause (whatever that might have been) which produced this boy's illness, produced also the illness (so far as that was specific) of his shipmates; that his case, in that it formed one of the first and most severely attacked group of sufferers taken ill on 23rd September, was representative of the earliest and intensest operation of that cause; and that it was representative also, and in a high degree, not of the anomalous but of the *enteric* class of cases; of those, namely, whereon diagnosis of the outbreak had been in the first instance based, and in regard of which a theory of trichinosis had appeared at one time well nigh untenable. Under the circumstances it was deemed unnecessary to proceed by vivisection of muscles of recovered cases to seek further and corroborative evidence as to the nature of the outbreak.

There now remains to be considered the circumstances under which trichina disease became conveyed to the boys. In this connexion must be noted a suggestion made for the first time while this report is in progress, that *the ship's* pork had not been *the source* whence the trichinæ had been derived. It was

[1] It is here assumed that migration to and growth and development of the trichinæ within the muscles practically ceased with the death of their host. The circumstance that any living trichinæ should have been found in this boy's muscles two months after burial proves merely the extraordinary vitality of this particular parasite. But on these aspects of the subject see Appendix A to this report.

ascertained by the Captain Superintendent that Pierce, the boy who died, had, among other things, in the present of food received from home shortly before his illness, a piece of fresh roast pork. This present of food (at the time thought to have been cake) has been already referred to; where it is stated, that although all the features of the outbreak could not be accounted for on the assumption that the food brought to Pierce was infective, still the illness of Pierce and his mess (No. 15), and other comrades attacked early in the outbreak, might possibly be so explained. Accordingly inquiry was made concerning this present of pork with a view of ascertaining what concern it might have had in the commencement of the outbreak. Considerable doubt existed in the first place as to the date on which this present of food was received; the evidence of some (and perhaps the most trustworthy) witnesses, fixing it at the end of August (three weeks to a month before the outbreak), that of others placing it at a much earlier period. The mother herself, who once only, she says, made her son a present of pork, thought she had done so shortly before the Bank holiday in August. Accounts, too, varied as to the amount of pork constituting the present; but upon this point perhaps the mother's statement is to be relied on. It was to the effect that she purchased, at 8*d*. per lb., $1\frac{1}{4}$ lbs. of loin of pork on a Saturday, and after dining on it with her daughter on Sunday, took the remainder to her son on visiting him on the following day. Neither she nor her daughter suffered subsequently from any illness. The pork was, she stated, well cooked, for the reason that she had an especial distaste for under-done pork. Of other witnesses on this point, some confirmed while others dissented from this statement. On one point only of the subject were the various witnesses unanimous: whatever may have been the quantity of the pork, the date of its reception, and the amount of cooking it had undergone, all agreed that Pierce consumed most of it himself. Two boys only could be found who acknowledged having tasted the pork, and neither of them were included in the list of sufferers by the outbreak. The members of Pierce's mess (No. 15), who were especially questioned on this subject, one and all denied having tasted the pork, and few of them were aware that Pierce had had any. It thus appeared

that of the first sufferers by the outbreak, none excepting Pierce had partaken of the particular pork in question; and that of those, including the mother and sister, who had consumed that pork, none, again excepting Pierce, had suffered by the outbreak. Probably, therefore, this pork had no concern whatever in causing illness on board the *Cornwall.*

The foregoing alternative having been disposed of, it seemed inevitable that the "American pork" on board the *Cornwall* was the source whence the trichina disease had been derived; and an attempt was now made to learn how it had happened that the method of cooking salt meat on board the vessel had failed to destroy the infectivity of the pork; and incidentally evidence was sought as to the extent to which the implicated pork (consisting of pieces from various animals, in two or more casks) might have been affected with trichina disease.—Cooking salt meat on board the *Cornwall* is effected by boiling it $3\frac{1}{2}$ to 4 hours; a process that seemed at first sight not unlikely to secure cooking of the meat, and one which has, so far as I could learn, commonly to a great extent achieved its object; the meat being spoken of as stripping easily from the bone. But when the details of the process come to be considered, cause appears for questioning the uniformity of cooking obtained by this method. Salt meat is cooked on board *in bulk:* 96 lbs. of beef or pork, as the case may be, are packed in a covered galvanised iron vessel of size just sufficing for the meat and the necessary water; the latter, when the meat is added to it, being nominally at boiling point.[1] The iron vessel with these contents is then placed over the central fire area of a stove of the "kitchener" type; and is assumed to be retained there from 8.30 a.m. until 12.30. Once only, it is said, during that period, is the vessel interfered with for the purpose of adding more water.[2] Now it will not be disputed that meat thus cooked on a large scale and in bulk, cannot, except after very prolonged boiling, get

[1] Plunging meat into water that is (or is nearly) boiling has been proved by experiment to retard the cooking of the interior of the meat.

[2] Other vessels, saucepans, &c., containing dinners of other persons are, along with the pork vessel, placed for cooking on the stove. Possibly in practice the pork may occasionally make way for these vessels (or some of them) and become removed from time to time from the premier place on the stove to a situation on the hot plate remote from the central fire.

equally cooked throughout. And the larger the mass of meat and the more closely the mass is packed into the cooking vessel, the longer will be the time necessary for the heat to penetrate into the interior of the meat, so as to ensure the complete cooking of its central parts. Hence in the case of 96 lbs. of meat, packed as the meat was packed on the *Cornwall* into a vessel of not many gallons' capacity, it may well be that pieces in the interior of the mass did not, during four hours' cooking, attain a temperature adequate to destroy the life of trichina parasites. Indeed it would surprise me to be told that such length of cooking was effectual to that end in the case of the *Cornwall* pork; for I myself can call to mind an instance in which a mass of salt beef, 60 lbs. in weight, after what was believed to be thorough cooking in a closed boiler during nine hours, was found in its centre conspicuously under-done, notwithstanding that its exterior presented an appearance of over-cooking. In this connexion it may be remarked that tradition, as handed down by cookery-books, prescribes a quarter of an hour's boiling for each pound of meat to be cooked. If this estimate is to be trusted the pork on board the *Cornwall* should have been boiled six times longer than was actually the practice; or else it should have been cooked in some fashion different from that ordinarily followed in "boiling."

Indications as to the quantity of the pork that might have been trichinised; as to the presence of the diseased portions in one or another cask; and as to possible specialty in distribution of such portions to a particular mess or messes, were sought for with much pains. It was hoped that some such indications might have been forthcoming during the above-recorded study of cooking operations, or from the dates of broachings of particular casks, and of the consumption of their contents. And, the pork having been consumed on certain Mondays while the manifestations of injury from its use were especially grouped about certain Tuesdays, there were many points of interest in the inquiry. Unfortunately, no record (as has been said) existed of the particular Mondays upon which pork had been consumed, or of that Monday whereon it was last eaten; nor was there any note of the date upon which each newly-broached cask of pork came into use. The pork (without discoverable trichinæ) in the

harness cask might, it was seen, have been derived from one or another original cask, without such original cask being therefore exculpated. What became evident during the search was this: that no affirmative statement on any of the above points could be justified. Of no part of the pork, whether from one or another cask, or from one or another animal, could it be said that it was originally infective. And while a large proportion of the total supply might have been diseased without producing more extensive mischief than that actually observed, so, on the other hand, a small proportion of the supply being diseased could, if it were distributed after the usual fashion, be related to a prevalence of illness having the proportions and distribution that were witnessed during the outbreak. Efficiency of cooking could destroy, as far as it went, the dangerous quality of a *large amount* of originally infective pork; whereas the customary plan of distributing the meat to the several messes might result in a *small quantity* of infective meat coming to be distributed somewhat widely. For, from an overplus service to one mess, a deficiency in service to another mess or messes is made up by bits or slices. Given a diseased joint as the portion designed for one mess, and bits of it taken as makeweights to other messes: and incidence of the resulting trichinosis, largely upon the one mess, and to a less degree on the other messes, becomes readily intelligible.

In bringing this report to a conclusion, certain matters that seem to call for attention may be briefly noted:—

Of all outcomes of this inquiry, both immediate and prospective, one of the most important is the circumstance that an outbreak of trichinosis has in many essential features aped an outbreak of enteric fever. This occurrence is, so far as I know, without recognised precedent in this country. No doubt in other countries something similar has occurred; but in those instances, so far as we hear of them, no sooner the cause of the outbreak seems to have been hit on than abundant and undoubted symptoms of trichinosis are found to have been observed in the patients. In the present case it was not so, for since the pathological evidence referred to was obtained I have again (along with the medical officer of the ship)

inquired of the boys attacked, respecting the nature, order, and succession of their symptoms; and I am constrained to admit that although symptoms doubtless referable to trichinosis could be elicited from many of the boys, still such symptoms had been seemingly very imperfectly developed; especially is it noteworthy that in no single instance had *many* of these symptoms together been present even in a minor degree. Possibly the absence of defined symptoms of trichinosis may have been in some degree due to the youth of the patients, for it is asserted by more than one authority that children suffer less severely from the disease than do adults. But however this may have been, it has in the end become apparent that no better designation for the majority of the cases (pathology apart) would be found than "simple continued fever." Now, heretofore it has been the custom to regard fevers that could be thus designated as partaking of the nature of either typhus or enteric fever, and as having no particular significance of their own. But the experiences here recorded point to other states of disease as being properly described under the name of continued fever. In particular cases where the evidences of typhus, enteric, or relapsing fever are inconclusive, and in outbreaks that are not capable of being surely designated by any one of these names, trichinosis (among other diseases) will now claim to be considered. The account that Mr. Mortimer de Brent (the medical officer of the ship) has given of the *Cornwall* disease, as it now presents itself to him after recognition of its parasitic nature, will be read with interest in this connexion. [It is given along with notes on microscopic investigation of muscles of the fatal case, drawings by Dr. Cory, and temperature charts of the cases, in an Appendix to the report.]

Another circumstance of interest is the small mortality in this outbreak. So far it is in accord with certain observations on the Continent. For although trichinosis has on many occasions proved very fatal, nevertheless there are on record very considerable outbreaks of the disease with but trifling mortality. At Magdebourg, from 1858 to 1862, 300 persons suffered from trichinosis, and two only died; at Gusten in 1861, 40 cases occurred without a single death; at Blankenburg in 1862 there were 278 cases, and only two deaths; and at Quedlinburg

in 1864, of 120 patients, two only died: a mortality, it will be observed, in no instance so high as 2 per cent. of the attacks. Probably enteric fever in outbreaks of any magnitude rarely occurs with a mortality of less than 10 per cent. Henceforward, therefore, outbreaks of so-called enteric fever characterised by exceptional paucity of fatal cases must needs be regarded with peculiar interest.

It is very noteworthy also that no suspicion could well have arisen respecting the nature of this outbreak, if it had happened that the disease, instead of occurring on ship-board, had attacked members of several different families living in town or country. In regard of enteric or of "continued" fever prevalence, under such circumstances, it is unlikely that the meat source of the sufferers would have been inquired about at all; and had inquiry in such direction been made, it is altogether doubtful whether, in view of the small proportion of attacks to escapes, community of meat source would, when found, have been deemed to be evidence of material value, even if the meat had been pork. In the present instance the result of inquiry must have been negative, if it had not been for the frank co-operation of the medical officer of the ship, and for the fact that the community concerned was in essentials known, in every detail of its daily life, to the Captain Superintendent; and that book-records concerning most matters of primary importance were put at my disposal. In thanking Captain Morrell very cordially for the help of which every page of this report gives evidence, I feel it is proper that I should observe that, in providing the ship with the article of food that has now come into question, there was no sort of suggestion that it could be unwholesome, and that he acted, as he always does, in the interest equally of the ship and of the boys; while as regards cooking operations, he merely followed time-established precedents in most ships and in many public institutions.

Finally, with reference to the question respecting cooking that has been raised, it seems desirable that direct experiment should forthwith be made to settle what are the precautions requisite to be taken for the thorough cooking of meat in establishments wherein such food is cooked *in bulk*. And further,

it deserves notice, that if efficient examination of imported pork had been matter of rule and duly enforced, this outbreak would in all probability not have occurred.

APPENDIX (A.)

MEMORANDUM on MICROSCOPICAL EXAMINATION, two Months after DEATH, of MUSCLES and VISCERA from the BODY of RICHARD PIERCE.

Portions of the following muscles were examined microscopically.—Diaphragm, obliquus abdominis externus, psoas, intercostal (fragment), pectoralis major, biceps brachialis and heart. Specimens also of bowel contents from various portions of the intestine, and specimens from its mucous surface were submitted to investigation. The muscles generally were œdematous, much decomposed, and offensive. In colour they were no longer ruddy, but instead, livid, greenish, or even purple in hue. Notwithstanding, in most muscles (except the heart), the fibres were easily made out, and in some the transverse striæ also. The heart was the most decomposed of all the muscles, and its tissue appeared much altered. The intestines were decomposed internally, and their mucous membrane stripped readily from the subjacent tissue. Here and there the mucous membrane had disappeared. The bowel contents were extremely offensive, and in an advanced stage of decomposition.

In all the muscles examined, excepting the heart and intercostal, wandering parasites were found. They may be said to have been moderately plentiful; one muscle only, the diaphragm, can be described as absolutely "infested" with parasites. In the intestine, no sexually mature worms could be discovered; but from the under surface of folds of its mucous membrane numerous very minute, short, hair-like bodies were obtained. Under a high power these bodies appeared to be without definite structure, with the exception perhaps of what might have been a central canal. Many were irregular in their outline, and most seemed partially decomposed. Probably they had once been brood parasites.

All the muscular parasites except one appeared dead when found, and none were encapsuled. Before dying, by far the greater number had failed to attain such size as is common in trichina spiralis at the completion of its wandering stage. In most respects, such as general appearance, shape, proportion of length to breadth, &c., they appeared identical with that parasite in its immature larval stage. As regards structure, however, these immature worms were indistinct, their interior having undergone granular change; many specimens were broken up and apparently more or less decomposed. Of the comparatively few parasites that had attained the full size of muscular trichinæ, the largest measured $\frac{1}{22}$ of an inch in length. Specimens of this size were in several instances translucent and "dropsical," being much distended by clear fluid; consequently their structure, especially that of their anterior portions, was extremely clearly defined. Herein they differed from non-dropsical specimens of similar apparent age whose structure had become indistinct owing to granular change in their interior. This dropsical condition of parasites was noticed for a short time only during the investigation. Before examination of the muscles had proceeded far, no specimens could be got that had not become opaque from granular change in their interior. [Probably "dropsy" did not occur (during investigation) except in

parasites that were dying or had not long been dead. In any case the number of such specimens was much restricted, and it became still further diminished by accidents due partly to thickness of cover-glasses, partly to extreme tenuity of the walls of the parasites. Under manipulation of a high power the specimens, besides being generally compressed and flattened out sometimes to the extent of nearly doubling their original breadth, became in most instances ruptured and their contents extruded. As a result of this compression and rupture of the best specimens, the structure of their anterior portions only can with any confidence be depicted.

Early in the investigation some doubt as to the identity of this wandering parasite seemed suggested in that the dropsical specimens presented, in their anterior portions, a much more defined structural appearance than that depicted by other observers in regard of trichina spiralis, and further, unlike that species as figured in books, their intestine, except indeed at its very commencement, presented little appearance of a succession of bead-like bodies (the so-called "rosary"), each with a central highly refractive spot. In this connexion, too, the circumstance that none of the numerous specimens observed were encapsuled, and few of them even suggestive of spiral involution, seemed to require explanation.[1] It was very soon seen, however, that all difficulties of the above sort might readily be explained with reference to the exceptional circumstances under which the parasites in question came to be observed. These were wholly different from conditions under which trichinæ have apparently yet been studied. Heretofore, observations of trichinæ have been pretty much restricted to those occurring in recently-deceased hosts, human and other, or in pigs, the flesh of which has been artificially preserved. No information is to be had respecting the behaviour of trichinæ in muscles that have undergone, as in the present instance, during many weeks post-mortem decomposition. Brief consideration, therefore, of these exceptional circumstances in their bearing on the subject is necessary. Early death (on the eighteenth day of illness) assisted by decomposition of the host, may suffice to explain the moderate (moderate, *i.e.*, in comparison with other observed cases) amount in the present instance of migration of parasites. It may serve also to account for the circumstance that comparatively few specimens had attained full growth as wandering parasites, that none were encapsuled, and that few exhibited any appearance of spiral involution. For a period of four to five weeks is set down as necessary for attainment by trichinæ of complete and encapsuled larval stage, and it seems that spiral involution of the worms is scarcely to be looked for short of commencement of that stage. Maturity, therefore, of many specimens could not be expected at the end of eighteen days. Probably death alone of the host may have sufficed to stop migration, and have largely checked subsequent development of parasites, the more so if they are dependent on the general circulation for their transmission to and growth in the muscles. But what death by itself (of the host) may have been unable to effect, may well have been accomplished by death and decomposition jointly. Though

[1] It will be observed that doubt as to identity of this wandering muscular parasite, if seriously raised at all, involves considerations of supreme importance. Its identity or non-identity with trichina spiralis would not alone be in question: for in view of the symptoms exhibited by Pierce and other sufferers by the *Cornwall* outbreak, possible relation of enteric fever to ravages of a muscular parasite would have to be investigated and dealt with; and current views respecting the etiology and pathology of that disease might require to be materially modified.—W. H. P.

death of a host may not (apparently it does not) affect the vitality of encapsuled trichinæ *that have ceased to feed*, non-nourishment of muscles and the decomposition of them which here followed death, may well have caused destruction of immature parasites that had yet to undergo in their wandering, further *feeding*, and growth. On the other hand, full-grown trichinæ, even if not yet encapsuled, to whom feeding is no longer a necessity, may (and evidently can) notwithstanding death and decomposition of their host, continue to exist in decomposing muscle long after their immature companions (which needed nourishment) have perished. In the present instance abstention from food of full-grown muscular parasites together with (instead of encapsulation) continued wandering in search (so to speak) of escape from adverse conditions, may well have sufficed after many weeks to produce in them absence from their interior of any extraneous matter, except water, and thus at length have rendered abnormally conspicuous certain details of their structure which, had they in ordinary course gone in a state of repletion into capsules, would have appeared indistinct or even altogether different. In view of all the circumstances dealt with, absence in dropsical parasites of well-defined "rosary" appears of little moment; the less since more recent examination of full-grown muscular trichinæ from pigs has shown that an appearance in any great degree comparable with the "rosary" of books is by no means to be looked for. Further, the presence in these dropsical parasites of well-defined structural appearance of the anterior alimentary apparatus, instead of raising question as to identity of species, may rather be regarded as affording better opportunity than has yet been had for study of the anatomy of trichina spiralis. Whether or not the specimens mainly concerned have (as certain larvæ may be believed to do when checked at particular stages of their development *as larvæ*) skipped (or abridged) a stage (that of encapsulation) in their life history, and while continuing to exist in the decomposing muscle, have gone on toward higher development in the direction of mature sexual intestinal trichinæ, is a question that need not here be discussed.

W. H. Power.
Robert Cory.

[We have reproduced at p. 470 the second only of the plates given by Mr. Power and Dr. Cory, in illustration of statements in the foregoing Memorandum.]

Figs. C, C², and C³ represent portions of a highly "dropsical" parasite from the pectoral muscle. The specimen became, during examination, ruptured, and its contents extruded.

C. Head, with mouth and œsophagus.

C². Middle portion of parasite (before rupture), showing indications of so-called bead-like bodies.

C³. Posterior end of parasite after compression, which has caused extrusion at the anal orifice.

Fig. E². A "non-dropsical" parasite from the diaphragm, showing the relation of length to breadth as it appeared viewed under a high power.

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